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September 1997

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Final Report for Field Studies of Nearshore Sedimentary Structures

by Thomas G. Drake,
North Carolina State University

Prepared for Headquarters, U.S. Army Corps of Engineers

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Final report

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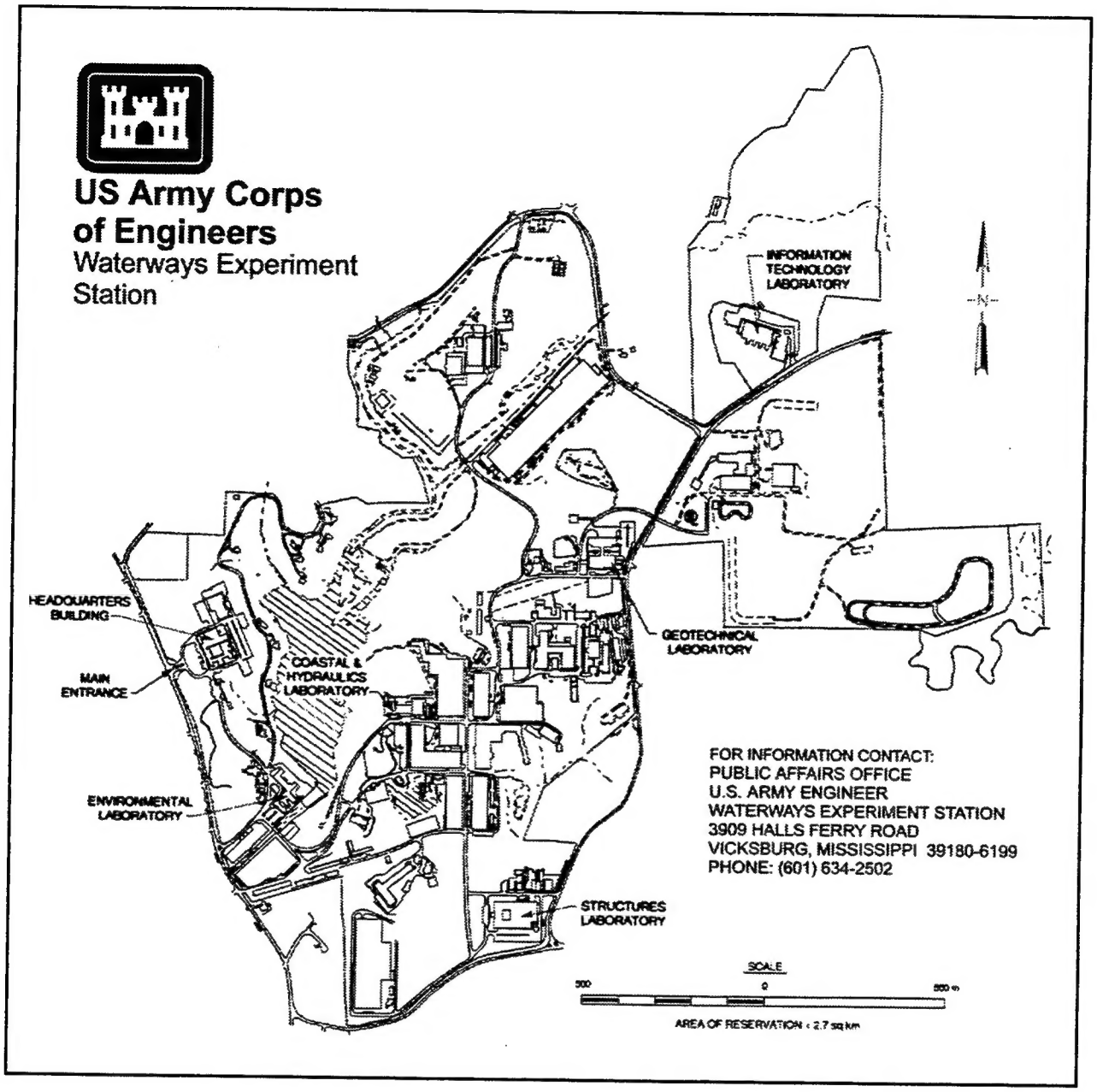

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Table of Contents

Conversion Factors, Non-SI to SI Units of Measurement

Non-SI units of measurement used in this report can be converted to SI units as follows:

Multiply	By	To Obtain
inches	0.0254	meters

Preface

The investigation summarized in this report was conducted by the U.S. Army Engineer Waterways Experiment Station's (WES's) Coastal and Hydraulics Laboratory (C&HL) and was selected for study and funded by the Coastal Sedimentation and Dredging Program. The Program Manager is Carolyn Holmes. This program is sponsored by Headquarters, U.S. Army Corps of Engineers (HQUSACE). The HQUSACE Program Monitors are Messrs. John H. Lockhart, Jr., Charles Chesnutt, and Barry W. Holliday.

Work was performed under the general supervision of Mr. William A. Birkemeier, Chief, Field Research Facility (FRF), C&HL; Mr. Thomas W. Richardson, Chief, Engineering Development Division, C&HL; Dr. James R. Houston, Director, C&HL.

The report was prepared by Dr. Thomas G. Drake of North Carolina State University, Raleigh, NC. Funding for this research was provided by CH&L (Contract DACW39-94-0037: Field Studies of Nearshore Sedimentary Structures). The vibracores used in this study were collected through the efforts of many individuals including Keil Schmid, Srinath Alapati, Mark Lampe, Mason Cox, Doug Dorman, and J.B. Smith. Technical and logistical support at the FRF was generously provided by Eugene W. Bichner, Brian Scarborough, and Charles R. Townsend, Mike Leffler, and Bill Grogg. William A. Birkemeier, Chief, FRF, provided supervisory and technical support, as well as much appreciated advice concerning field operations. Beach and nearshore survey data for documenting profile dynamics at the FRF site were provided by C&HL through the courtesy of William A. Birkemeier.

At the time of publication of this report, Director of WES was Dr. Robert W. Whalin. Commander was COL Bruce K. Howard, EN.

Introduction

The research described herein is a part of the Duck94 Nearshore Processes Field Experiment, a multi-disciplinary study that took place during the summer and fall months of 1994 at the U.S. Army Engineer Field Research Facility (FRF) at Duck, North Carolina. The work comprises reconnaissance field studies seeking to develop tools for hydrodynamic and bathymetric interpretation of nearshore sedimentary structures, using as primary data sediment cores taken in close proximity to fluid-motion and bed-elevation measurements. This report conveys the following products listed in contract DACW39-94-K-0037, as modified 29 March 1994:

> Sedimentological data from cores obtained by Drake will be maintained in the form of core logs, which will record the time, location and orientation of each sample, and a description of sedimentary structures obtained by visual inspection. The following ancillary data will be provided by Scripps Institution of Oceanography (SIO) investigators R.T. Guza, S. Elgar, and E. Gallagher for cores obtained by Drake which are located within 20m of the SIO cross-shore instrument transect: mean water depth, mean wave height, mean cross-shore and mean alongshore fluid velocity and net change in bed elevation at the nearest SIO sensor, where the time interval for net change in bed elevation and averaging all quantities will be determined by the principal investigator. The ancillary SIO data will be provided under the Duck94 data sharing policy of no unapproved dissemination to third parties. Relationships between sedimentary features observed in the cores and fluid motion and bed elevation studies will be explored in collaborative interaction with SIO, NPS and/or FRF investigators, with the aim of producing one or more articles for publication in refereed scientific journals. A final report covering the period of support and including the core logs will be provided at the end of FY95. No provision is made in this proposal for preservation or storage of cores.

A no-cost extension of the original contract through 31 March 1996 was provided to accommodate additional analysis of ancillary data provided by SIO collaborators.

Synopsis of Results

Few studies of sedimentary structures in the nearshore have been undertaken (e.g., Clifton *et al.*, 1971; Hunter *et al.*, 1979; Greenwood and Osborne, 1991) and none have had the benefit of the substantial supporting studies conducted during the Duck '94 experiment, in particular, a cross-shore transect of instruments designed to provide measurements of water depth, bed elevation, and cross- and alongshore components of nearbed water velocity at a frequency of 2 Hz for the duration of the Duck '94 experiment. Observations of these fundamental fluid-dynamic quantities, provided by investigators R.T. Guza and S. Elgar of the Center for Coastal Studies, Scripps Institution of Oceanography, University of California at San Diego, form the basis for relating sedimentary structures from sediment cores obtained using the FRF's Coastal Research Amphibious Buggy (CRAB). Analyses of the cores were undertaken both during the course of the experiment and afterwards at North Carolina State University.

The principal findings of this investigation are the following:

- Sedimentary structures observed in the cores, in particular, bedding planes or other evidence of stratification, are generally rather poorly correlated with synthetic stratigraphies generated from sonic altimeter observations of bed elevation. In a few particular cases, however, the correlation between structures observed in cores and sonic altimeter observations is good, and may offer useful means for using structures from cores to retrodict the wave climate responsible for their formation, or vice-versa. Techniques for generation of synthetic stratigraphies and special cases of interest are discussed in detail below.
- Alongshore variation in sedimentary structures from cores obtained at the same nominal cross-shore location may be substantial, which carries the implication that even apparently two-dimensional nearshore environments (such as that at the Duck study site (Stauble, 1992)) may not be adequately sampled by a single or even several cross-shore transects.
- Presence of estuarine mud near the present seabed in several cores suggests that sediment supply in the vicinity of the Field Research Facility may be limited, and that relatively non-erodable substrate may crop out in the surfzone. That the underlying geology may strongly influence shoreface evolution along the Outer Banks has been previously suggested (Riggs *et al.*, 1995), but extant predictive models for bathymetric evolution uniformly assume sufficient sediment supply at all times. The possibility of insufficient supply and its effects

must be addressed in future studies.

- Cores extracted from the crest of a newly-deposited bar formed entirely during the course of the Duck '94 experiment show unequivocally that offshore bar migration occurred by the onshore migration of megaripples from deep water onto the offshore side of the bar, while unknown processes eroded the onshore side of the bar. Evidence for megaripple-induced bar migration is in the form of onshore-dipping cross-bedded sand layers preserved in the cores, which can only result from grains avalanching down the slipface of an onshore-migrating bedform. Much ancillary evidence for the presence of such bedforms exists, but the only unequivocal evidence of the direction of their migration is found in oriented bar-crest cores. This result is unexpected, since hydrodynamic data (e.g. Gallagher, 1996) indicate pervasive offshore water velocities over most of the vertical water column, and models for sediment transport (e.g. Bowen, 1980; Bailard, 1981, hereafter called the Bowen/Bailard model) which use the velocity data predict both net offshore sediment transport and offshore bar migration. Our data show that, while *offshore* flow higher in the water column most likely transported suspended sediment offshore over the bar crest, nearbed velocities must have driven megaripple migration in the *onshore* direction. Such observations 1) call into question the efficacy of the Bailard/Bowen model, and 2) point to the need for considerably more work on fundamental sediment-transport processes, in particular, the mechanics of megaripple migration.
- Finally, logistical difficulties associated with surfzone coring studies are considerable. For the very limited set of conditions explored during the course of this reconnaissance study, the predictive value of most of the cores obtained is equivocal. On the other hand, we now know the conditions under which cores are likely to obtain extremely useful information that cannot be obtained by direct (and expensive) surfzone observation of the usual hydrodynamic variables, in particular the near-bed fluid velocity. The evidence for megaripple-induced bar migration offered by sedimentary structures in the cores is immensely valuable, and exists nowhere else in the collective Duck '94 dataset.

The body of this report consists of a description of coring and analysis techniques, an overview of sedimentary structures observed in the cores and their significance, and a detailed examination of some particularly significant cores. Supporting information includes a table of

cores taken during the experiment, including relevant hydrodynamic quantities from SIO investigators, detailed visual descriptions of most of the cores and descriptions of radiographs which were obtained for some of the cores. Some of the information contained herein was presented by Mr. J.B. Smith, Contract Officer's Representative for this contract, at the Geological Society of America Annual Meeting in New Orleans, Louisiana, November, 1995 (Smith *et al.*, 1995). A videotape showing an animated visualization of a typical synthetic stratigraphy generated from bed-elevation time series is available from the author of this report.

Methods and Analysis

Short vibracores obtained using the FRF's CRAB as a coring platform provided essentially all the sedimentological information for this study. Attempts to use small boxcores in the surfzone proved unsatisfactory, for one or more of the following reasons: poor or hazardous diving conditions; including large waves in shallow water, strong currents, poor visibility and concomitant difficulty in establishing the location and orientation of the core; box-core equipment failure due to compacted, fine-grained bottom sediment. Vibracores were obtained after several significant sedimentologic events using the CRAB. Standard techniques were used to obtain cores in three-inch-diameter aluminum tubes; sample location and orientation were determined from CRAB instrumentation. Core locations are reported in meters in the FRF coordinate system, and elevation of the seabed (or top of the core) is referenced to NGVD. The nominal resolution in all three coordinates is about 10 cm; for the highly irregular bathymetry associated with megaripples the bottom elevation may vary by 30 cm or more from the reported value, due to the location of the survey reference point on the top of the CRAB, rather than at the seabed. The coarse nature of the bed material precluded the effective use of a core-catcher, and some cores of coarse sand and gravel were disturbed during the coring and/or extraction procedure. Such disturbances are noted in the core logs; and in general, the uppermost 10 cm to 25 cm of the cores do not yield reliable sedimentary structure information.

All cores were cut longitudinally such that the cutting plane trended in the on-offshore direction, for the purpose of revealing cross-stratification of on-offshore migrating bedforms. This choice of orientation effectively biases the observations, as stratification due to alongshore migrating bedforms may not be evident in cores cut as described above. Once cut, cores were logged visually by Mr. Keil Schmid (Table 1 and Appendix A). Selected cores were slabbed for x-ray radiography using conventional techniques (Appendix B). Particular care was made to distinguish erosional contacts and their orientation in the cores, as these are the primary indicators of sediment-transport mechanisms.

Hydrodynamic data was obtained from SIO investigators R.T. Guza and S. Elgar for sensors located on a cross-shore transect extending from the swash zone to about 900 m offshore. Figure 1 shows the location of the SIO instrument transect and the vibracores taken during this

Table 1. List of all vibracores collected at Duck NC Field Research Facility during Duck '94

Tom Drake, J. Bailey Smith, Keil Schmid, Srinath Alapati

Data provided for cores within 20 m of SIO transect

Weighted by depositional thickness of sedimentary strata

Core No.	Date	Days after July 20th	Core Location, FRF coords: Longshore Y (m)	Cross-shore X(m)	Elev NGVD (m)	Net deposition (cm)	U (+ onshore) (cm/s)	V (+ to south) (cm/s)	Significant Wave height (cm)	Current Direction (0=north)
1	9-Aug-94	20	998.8	313.9	-3.42					
2	9-Aug-94	20	998.8	311.8	-3.40					
3	9-Aug-94	20	1000.7	160.3	-1.90					
4	11-Aug-94	22	992.7	183.2	-1.52					
5	11-Aug-94	22	991.8	206.0	-1.80					
6	11-Aug-94	22	940.9	169.8	-1.40		no sensor data			
7	11-Aug-94	22	941.5	207.9	-1.77	2.50	no hydrodynamic data before 25.96 days after 20 July 1994			
8	11-Aug-94	22	960.7	169.2	-1.32					
9	18-Aug-94	29	940.0	135.0	-0.26		no sensor data			
10	18-Aug-94	29	940.0	190.2	-1.69		no sensor data			
11	18-Aug-94	29	940.0	220.2	-2.07	9.99	-2.30	-17.50	84.10	7
12	18-Aug-94	29	940.0	240.6	-2.35	63.75	-5.90	-19.50	42.70	17
13	19-Aug-94	30	991.1	138.6	-0.52					
14	19-Aug-94	30	991.0	146.6	-1.08					
15	19-Aug-94	30	992.2	219.9	-1.74					
16	19-Aug-94	30	992.6	240.8	-2.08					
17	19-Aug-94	30	992.6	242.4	-2.23					
18	19-Aug-94	30	960.0	220.7	-1.86					
19	19-Aug-94	30	960.5	205.6	-1.83					
20	19-Aug-94	30	961.3	145.7	-0.60					
21	19-Aug-94	30	961.4	135.3	-0.02					
22	19-Aug-94	30	939.4	230.0	-2.10	63.28	-5.50	-16.10	42.30	25
23	19-Aug-94	30	939.5	209.8	-1.86	7.47	no current data		66.80	
24	19-Aug-94	30	940.0	168.8	-1.54		no sensor data			
25	19-Aug-94	30	940.8	145.4	-0.88		no sensor data			
26	19-Aug-94	30	951.7	169.3	-1.55		no sensor data			
27	19-Aug-94	30	950.3	205.8	-1.79	7.47	no current data		66.80	
28	25-Aug-94	36	991.5	599.0	-5.77					
29	25-Aug-94	36	992.3	498.9	-4.91					
30	25-Aug-94	36	992.6	400.0	-4.40					
31	25-Aug-94	36	991.8	346.7	-4.07					

Core No.	Date	Days after July 20th	Longshore Y (m)	Cross-shore X(m)	Elev NGVD (m)	Net deposition (cm)	U (+ onshore) (cm/s)	V (+ to south) (cm/s)	Significant Wave height (cm)	Current Direction (0=north)
32	8-Sep-94	50	939.6	270.2	-2.28	60.73	-29.10	62.10	163.20	155
33	8-Sep-94	50	940.3	260.2	-1.92	60.73	-29.10	62.10	163.20	155
34	8-Sep-94	50	940.6	250.1	-1.80	95.67	-17.70	31.40	82.90	140
35	8-Sep-94	50	940.5	239.9	-1.95	95.67	-17.70	31.40	82.90	140
36	8-Sep-94	50	940.5	230.4	-2.05	13.50	-23.50	0.20	94.00	84
37	8-Sep-94	50	940.3	217.7	-2.05	13.50	-23.50	0.20	94.00	84
38	9-Sep-94	51	940.5	210.3	-2.06	20.00	-1.40	-9.50	63.90	218
39	9-Sep-94	51	940.4	205.1	-2.07	20.00	-1.40	-9.50	63.90	218
40	9-Sep-94	51	939.5	170.4	-2.11		no sensor data			
41	9-Sep-94	51	940.3	152.6	-1.72		no sensor data			
42	9-Sep-94	51	940.2	146.2	-1.13		no sensor data			
43	9-Sep-94	51	960.7	219.9	-2.08					
44	9-Sep-94	51	960.9	250.0	-1.83					
45	9-Sep-94	51	960.2	270.2	-2.21					
46	9-Sep-94	51	960.3	260.1	-1.94					
47	9-Sep-94	51	960.1	239.8	-1.97					
48	9-Sep-94	51	960.0	230.3	-2.07					
49	9-Sep-94	51	960.9	152.9	-1.51					
50	21-Oct-94	93	940.3	370.0	-3.65		no sensor data			
51	21-Oct-94	93	939.6	340.4	-2.98	22.71	-18.40	-2.10	185.30	105
52	21-Oct-94	93	939.8	167.0	-1.64	83.86	-15.30	2.90	116.10	89
53	21-Oct-94	93	939.3	320.0	-2.83	22.71	-18.40	-2.10	185.30	105
54	23-Oct-94	95	939.6	348.1	-2.80		no sensor data			
55	23-Oct-94	95	939.9	330.0	-2.42	102.07	-5.20	-0.50	86.70	156
56	23-Oct-94	95	939.6	309.8	-2.72	102.07	-5.20	-0.50	86.70	156
57	23-Oct-94	95	1006.0	360.2	-3.16					
58	23-Oct-94	95	1005.3	340.2	-2.55					
59	23-Oct-94	95	1006.1	320.2	-2.09					
60	23-Oct-94	95	940.2	160.0	-0.95		no sensor data			
61	23-Oct-94	95	940.3	154.8	-1.19		no sensor data			
62	25-Oct-94	97	940.8	320.7	-2.50	112.00	-4.80	-0.30	83.70	156
63	25-Oct-94	97	940.8	317.5	-2.59	112.00	-4.80	-0.30	83.70	156
64	27-Oct-94	99	940.0	135.1	-0.32		no sensor data			
65	27-Oct-94	99	940.0	119.3	0.42		no data (dry beach)			
66	27-Oct-94	99	940.0	102.9	2.12		no data (dry beach)			

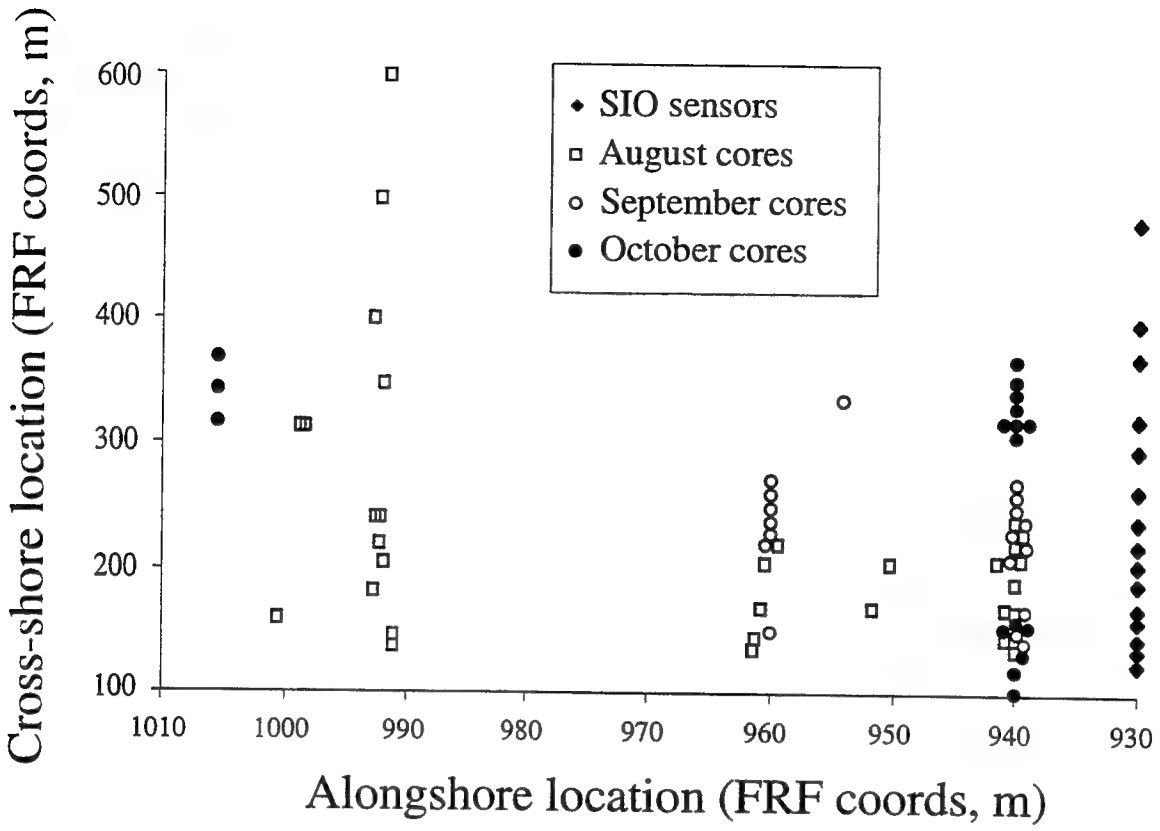

Figure 1. Vibracore locations for three periods during the Duck '94 experiments. August cores were obtained before substantial deposition occurred; September cores were obtained after a brief but intense storm; and October cores were obtained approximately one week after a sustained Nor'easter. Symbols are shifted in the alongshore direction if overlaps would otherwise obscure locations.

study. Table 1 provides details of the vibracore locations and averages of the hydrodynamic data; Table 2 lists the locations of the SIO instrument packages. All hydrodynamic data provided by SIO investigators is subject to the Duck '94 data-sharing agreement, with no distribution to third-party investigators without prior permission. Water-surface elevation, bed-surface elevation, cross- and alongshore components of water velocity were obtained at 2 Hz frequency for most of the Duck '94 experiment. From the 2-Hz data, SIO investigators provided this study with 17-minute averages for water surface elevation, significant wave height, and cross- and alongshore current velocity. The sign convention for water velocities is positive **u** (cm/s) in the onshore direction, and positive **v** (cm/s) to the south.

Time series of bed elevation data are post-processed using a "bottom-finding" algorithm

Table 2. Instrument Locations on the SIO Cross-Shore Transect[1]				
Sensor	X(m)	Y(m)	Elevation (m, NGVD)	Comment
p01	830	124.9	0.54	No sonic altimeter or current
p02	830	135.0	-0.31	
p03	830	145.4	-0.92	
p04	830	160.8	-0.58	
p05	830	169.5	-0.63	Sonic heart (array of 7 altimeters)
p23	830	190.2	-1.10	2m-stack, no sonic, 3 current meters
p12	830	205.3	-1.04	
p13	830	220.2	-1.34	
p14	830	240.6	-1.63	
p15	830	264.7	-1.90	
p16	830	295.8	-3.14	No sonic altimeter
p17	830	320.4	-2.93	
p45	830	370.1	-4.31	4m-stack, no sonic, 3 current meters
p18	830	398.4	-3.71	
p19	830	480.3	-4.76	No sonic
p87	830	885.0	-7.79	8m-stack, no sonic, 7 current

[1] Pressure sensors are buried beneath the seabed, and elevation of other sensors varies but is typically less than 0.5 m above the seabed. These elevations correspond to locations established at the initiation of the Duck '94 experiment.

(Gallagher *et al.*, 1996) to provide bottom-location estimates in the surfzone having resolution on the order of ±3 cm about twice per minute. Because the generation of synthetic stratigraphies depends directly on the implementation of the bottom-finding algorithm, a brief description of the algorithm follows:

A histogram having 2-cm-wide distance bins is constructed from 512 bottom samples obtained at 2 Hz. The bin having the highest number of occurrences (excluding distances less than 25 cm) provides a rough estimate of the distance to the seafloor. A second set of histograms having 0.5-cm-wide bins is then calculated for each of eight 32-second-long subintervals of the

original 512 samples. These bins are centered ±20 cm of the maximum obtained from the 512-sample histogram. The maxima of the 32-second histograms provide estimates of the distance to the seafloor every 32 s.

Synthetic Stratigraphy

Time series of bed elevations are used to generate "synthetic" stratigraphies for each of the sonic altimeter sensors. In concept, the generation of such stratigraphies is straightforward (Figure 2), but entails numerous assumptions in practice, due to smoothing and filtering of the

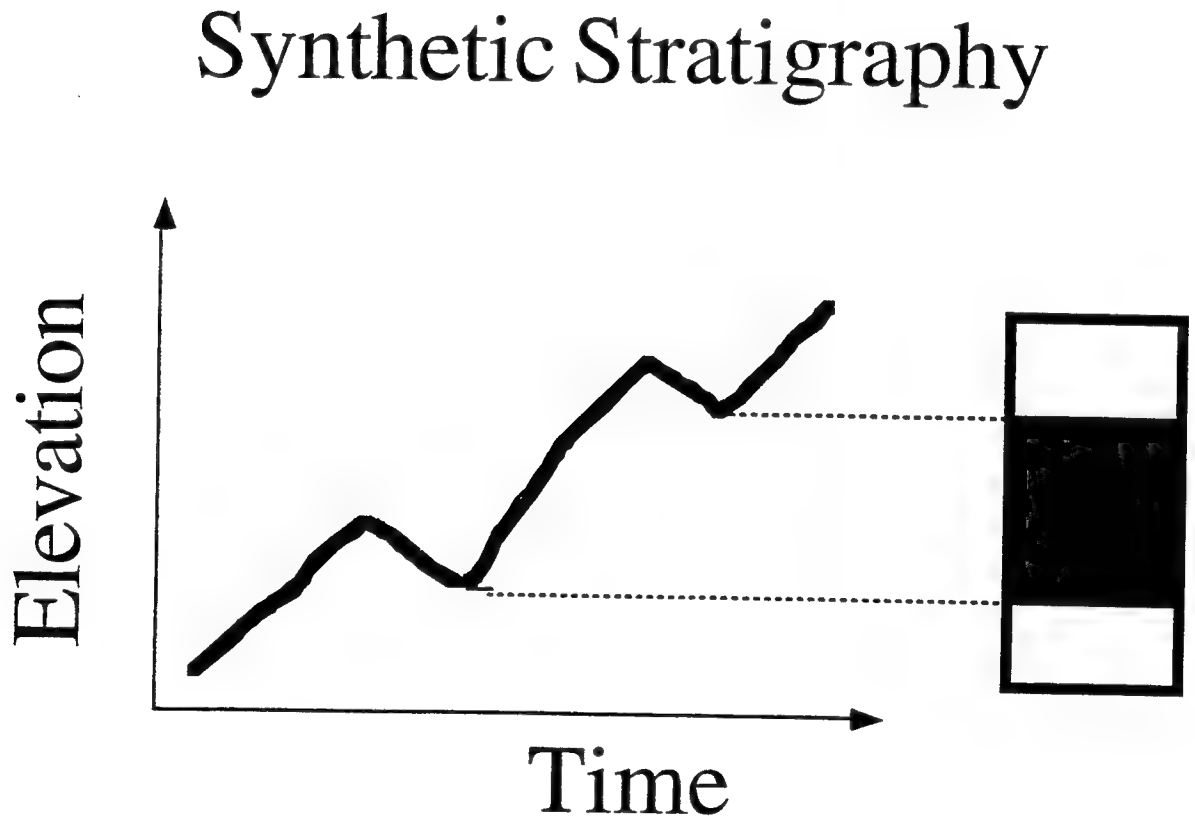

Figure 2. Schematic of synthetic stratigraphy generation using time-series of bed elevation. Alternating black and white bars are hypothetical strata; erosional contacts separate strata.

noisy altimeter data. For each time interval in which the bed elevation remains constant or increases, corresponding to deposition or lack of erosion, a single stratum is produced. The position of the bottom of the stratum corresponds to the start of data acquisition. If the bed elevation decreases, the single stratum is eroded, and the new eroded top of the stratum is thus an unconformity, or depositional hiatus. The stratum may be completely or partially eroded, until deposition is re-initiated and a new stratum is generated. Importantly, there is no information available about the bed history prior to the start of data acquistion; thus sedimentary features only millimeters below the initial bed surface may be minutes or thousands of years old. Likewise, if hundreds of centimeters of deposition are subsequently removed by erosion before a core can be taken, no sedimentary record of the depositional processes can be extracted. Such obvious limitations have and will continue to severely hinder process-oriented sedimentological studies.

Practical problems arise in attempting to determine whether fluctuations in bed-elevation measurements from the sonic altimeters correspond to true fluctuations of the bed surface. Without *a priori* information to guide our choice of filtering parameters, we attempted to optimally select parameters to "best-fit" the number and thickness of strata observed in cores to similar descriptors derived from synthetically generated stratigraphies. Our inability to find such suitable parameters may be attributed to one or more of the following:

Difficulties in visual identification of strata in the cores. Radiographic studies of several selected cores failed to reveal strata in apparently massively-bedded, fine-sand deposits. Such deposits may typify deposition during energetic conditions in the absence of sufficiently rapid bedform migration to create laminae.

Difficulties in evaluating errors in sonic-altimeter data. Altimeter resolution and accuracy are inversely related to some function of the sea-state energy (e.g., significant wave height), while changes in sea-bed elevation are positively correlated significant wave height. Insufficient independent data are available to quantify such errors.

To the extent possible, coring was undertaken when bed elevations were increasing, so that the cores could be expected to contain sediments deposited under known hydrodynamic conditions. In practice, however, logistical constraints including weather and CRAB availability

hindered efforts to obtain cores having high information density, and many of the cores contain sediment for which there is no hydrodynamic or bed elevation data. Furthermore, many of the cores were taken much more than 20 m distance from the SIO transect; and these cores are not examined in detail in this report.

Bar Migration Deposits

One of the primary objectives in nearshore research is to determine the sediment-transport mechanisms for bar migration. During the course of the Duck '94 experiment, several bar migration episodes occurred, all of them relatively rapid and in the offshore direction. The typically much slower onshore migration characteristic of spring and summer low-energy conditions was not sampled during this experiment; thus introducing a significant potential bias in the interpretation of nearshore sedimentary deposits. Nevertheless, several cores were taken after a major Nor'easter occurred in mid-October, and analyses of them reveal several features of interest.

Cores 62 and 63 were obtained 25 October 1994, appoximately one week after the cessation of the storm. During the storm the low, linear bar migrated offshore approximately 100 m, and buried the SIO sensors at X=320 m (p17 and associated instruments). The cores are located at the same alongshore position; and core 62 was taken at a cross-shore position X=320.7 m, while core 63 was extracted at X=317.5 m, or approximately 3 m closer to shore. The elevations of the tops of the cores differ by 0.09 m, which corresponds to diver observations of variations in bed surface elevation obtained during the coring procedure. Perhaps surprisingly, these cores exhibit rather distinct sedimentary structures, as shown schematically in Figure 3. An incomplete synthetic stratigraphy shows tantalizing hints about the conditions just preceding and after sensor burial at the height of the storm (Figure 4).

Implications for Mechanisms of Offshore Bar Migration

The uppermost 0.75 to 1 m of each of cores 62 and 63 exhibits well-developed shoreward-dipping crossbeds, which are interpreted as indicative of shoreward bedform migration. Such deposits are essentially unequivocal evidence for *onshore* migration of megaripples, which effected the *offshore* migration of the bar form, perhaps in concert with concurrent deposition of suspended sediment eroded from the onshore side of the bar. Figure 5

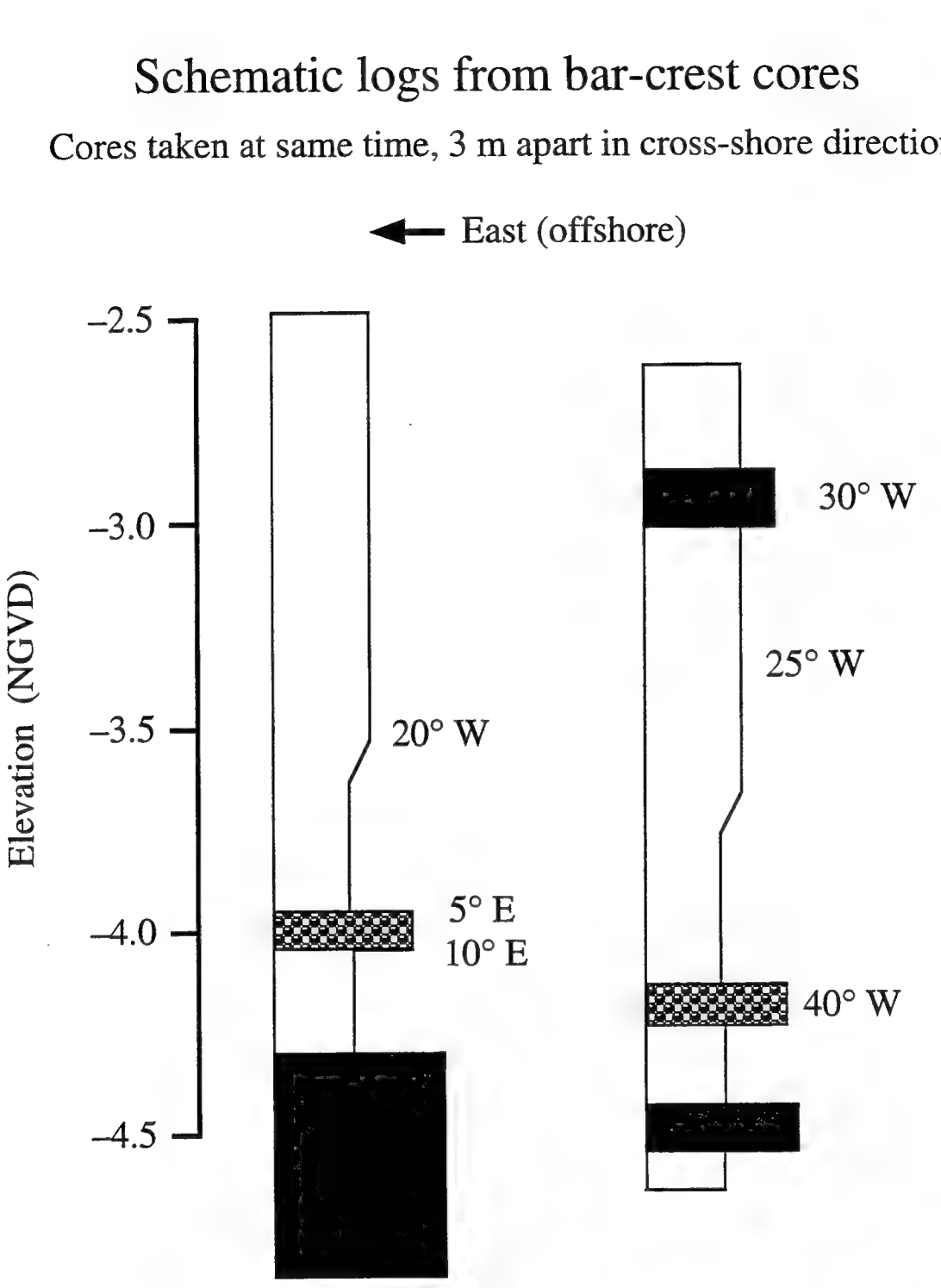

Figure 3. Schematic log showing major sedimentological features of cores 62 (left) and 63 (right), collected 25 October 1994, approximately one week after a major Nor'easter induced offshore-directed bar migration of about 100 m. Despite their relative proximity, the cores are distinctly different, and exhibit cross-strata indicative of bedform migration both on- and offshore.

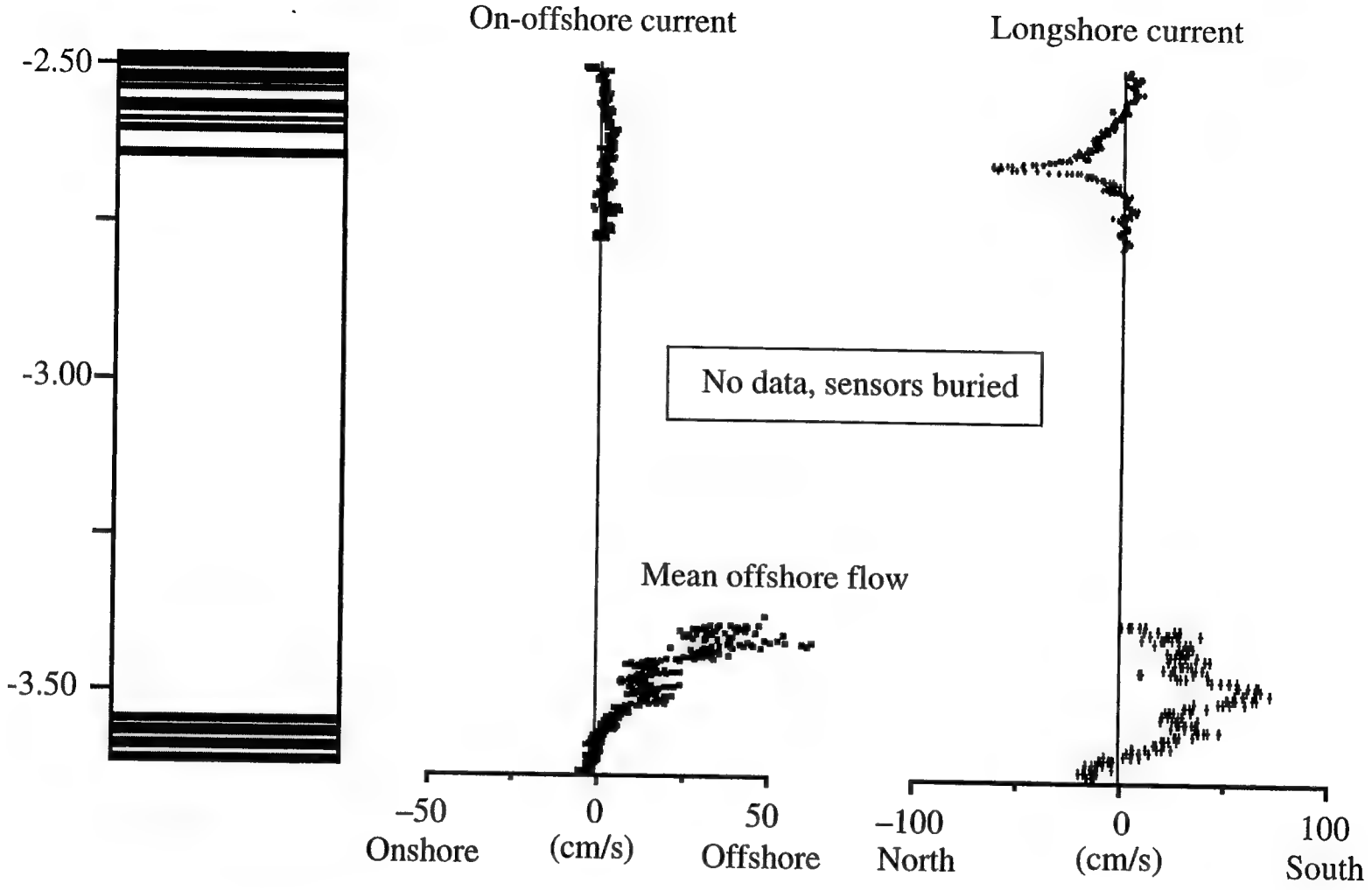

Figure 4. Synthetic stratigraphy and near-bed water velocities from SIO sensors located at cross-shore location X=320 m corresponding to cores 62 and 63. A strong mean offshore flow was measured at this location before instrument burial, and such flows were measured throughout the storm at other cross-shore locations. The uppermost 0.75 to 1 m of cores 62 and 63 exhibit onshore (west) dipping crossbeds, however, which would typically be interpreted as indicative of onshore bedform migration.

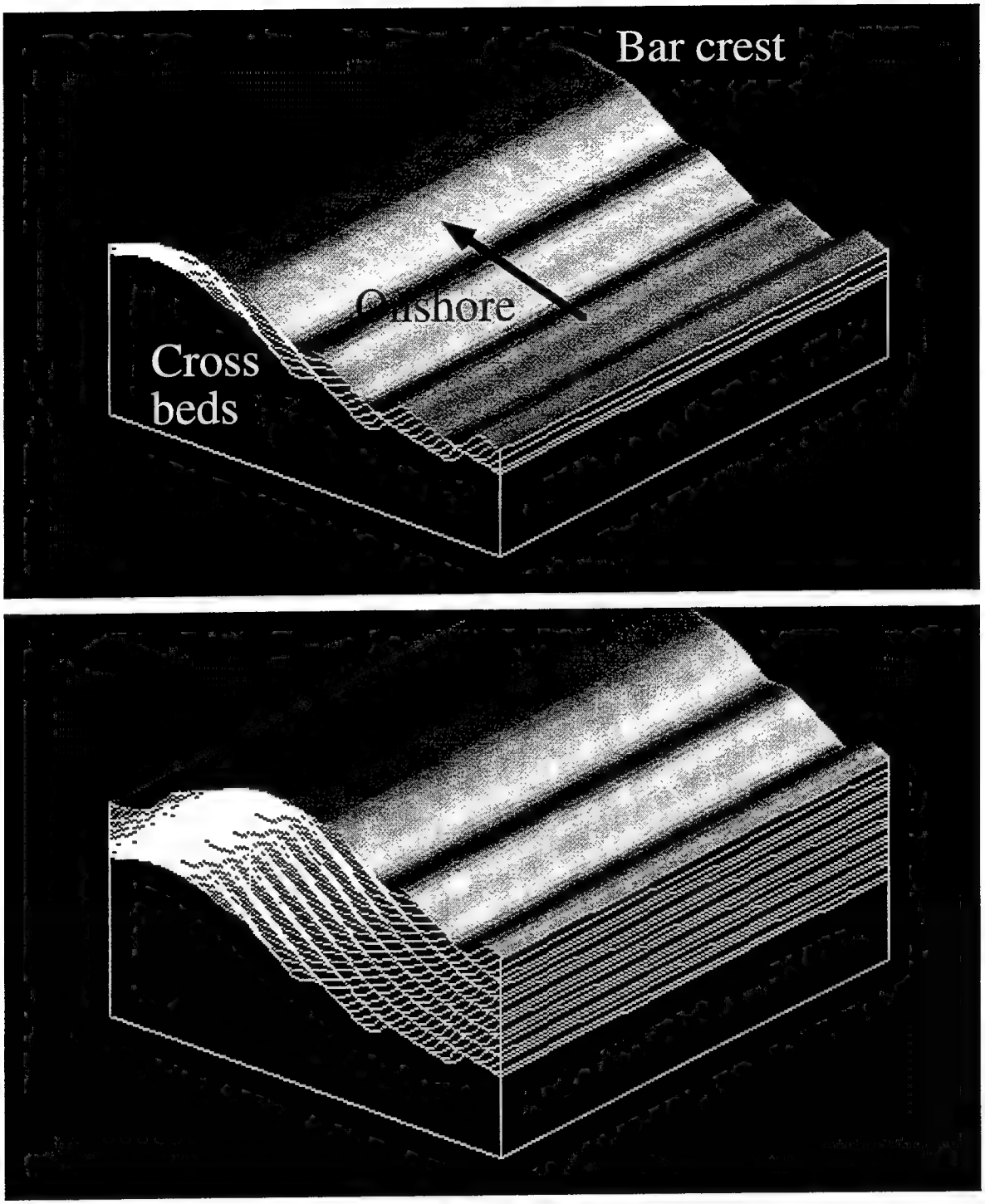

Figure 5. Onshore migration of megaripples deposits sand on the offshore side of the bar crest, which is simultaneously eroding on its onshore side. Top figure shows megaripples at the start of bar migration, and bottom figure shows sequence of cross beds after bar migration. This schematic depiction was created using computer software developed by Dr. David M. Rubin, US Geological Survey (Rubin, 1987).

shows a schematic diagram of the megaripple migration processes inferred to operate on the offshore side of the bar. Figure 6 is a somewhat more speculative picture of one possible scenario for eroding the onshore side of the bar as it migrated offshore; there is considerable evidence for the existence of megaripples migrating alongshore in the bar trough during the bar migration event (Gallagher, 1996; Thornton, personal communication, 1994). Evidence for megaripple-induced bar migration is in the form of onshore-dipping, cross-bedded sand layers preserved in the cores, which can only result from grains avalanching down the slipface of an onshore migrating bedform. Much ancillary evidence for the presence of such bedforms exists (Gallagher, 1996; Thornton, personal communication, 1994), but the only unequivocal evidence of the direction of their migration is found in these oriented bar-crest cores.

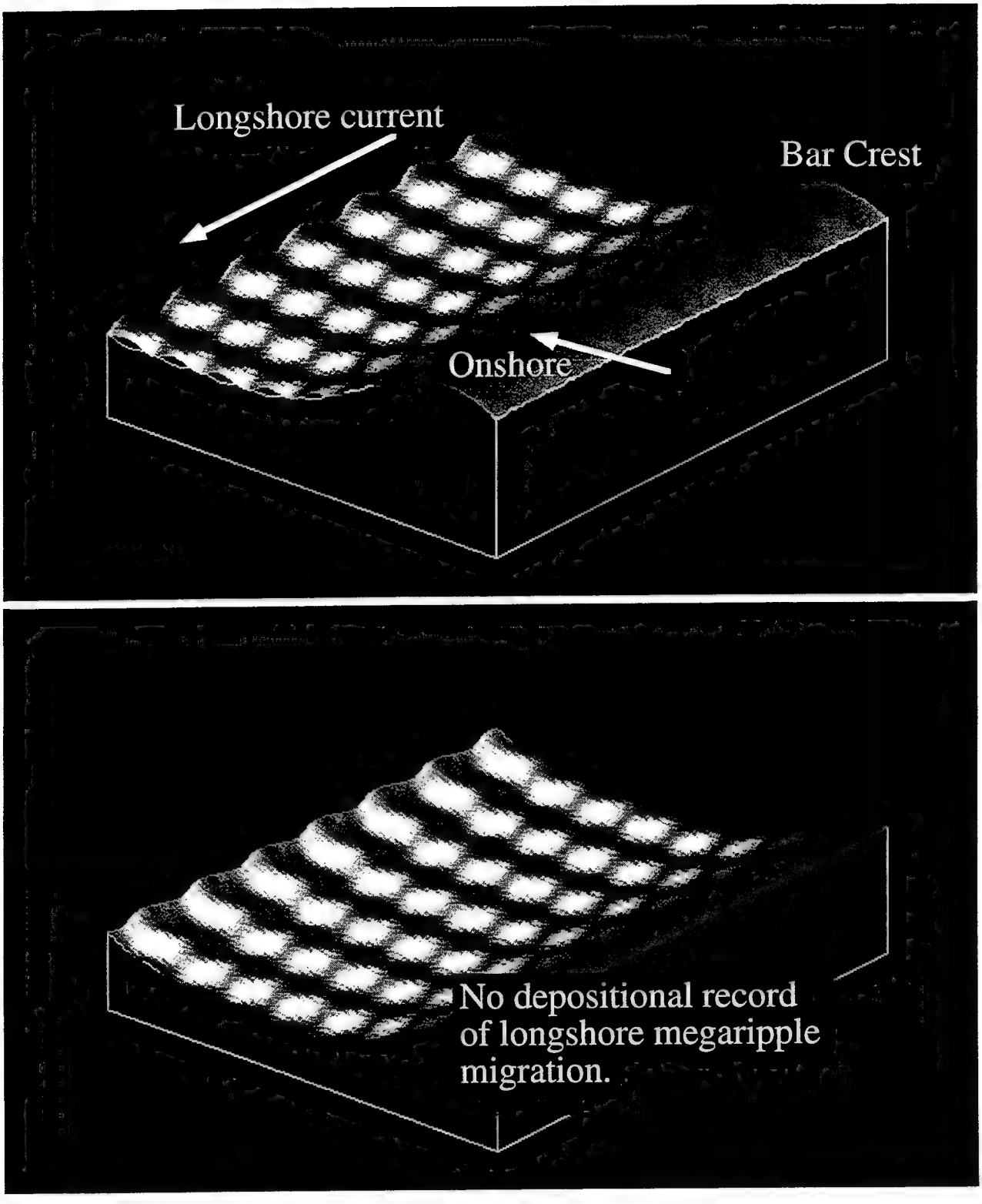

Figure 6. Alongshore migration of megaripples on the onshore side of the bar crest during offshore bar migration leaves essentially no sedimentary record of the processes effecting bar migration.

Acknowledgments

The assistance of the FRF staff during the course of the Duck '94 experiment is gratefully acknowledged; in particular, Chief Bill Birkemeier, Gene Bichner, Bill Grogg, Mike Leffler, Brian Scarborough and Ray Townsend provided us expert assistance on a regular basis. Mason Cox, Doug Dorman and Mark Lampe drove the CRAB and assisted with vibracoring efforts under difficult conditions. Equipment loaned to us by Dr. Stan Riggs, East Carolina University, greatly eased several early difficulties with coring apparatus.

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Appendix A – Visual Core Logs

Visual core logs were generated solely by Mr. Keil Schmid to assure consistent description of sedimentary grain size and structure. Handwritten core logs have been converted into computer-form for ease of reading and consistency. Each log records the date of coring and logging, the location in the FRF coordinate system, a graphic depiction of core lithology, dip of sedimentary features (in degrees to the east or west), grain size in ϕ_(phi) units, where the grain size in millimeters D is obtained from ϕ by the following relation:

The absolute elevation of sedimentary features in the cores is obtained by subtracting the distance from the top of the core from the Z coordinate of the core location. For example, the black-green mud found at the base of Core #2 occurs at an absolute elevation (NGVD) of –3.40 m – 1.50 m, or –4.90 m (NGVD). The graphic depiction of the logs is intended to provide a visual picture of the structures of interest; because the usual sedimentary logging symbols can not adequately depict subtle features in these cores, various patterns are used to indicate relative changes of grain size or texture within a single core. Several of the longer cores are described on two or more consecutive logs because cores of length greater than about one meter were typically cut into pieces for safe transport. In these cases the logs are labeled "top" and "bottom," where "top" refers to that portion of the core immediately adjacent to the seafloor-water interface. Cores extensively damaged during the coring process or subsequent transport were not logged.

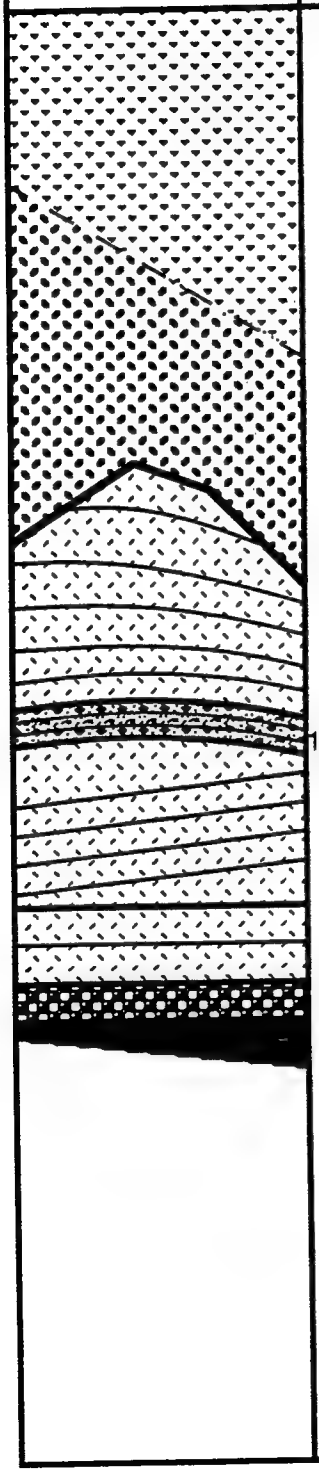
Following is a list of cores for which logs were obtained:

Core #02
Core #03
Core #04
Core #05
Core #06
Core #07
Core #08
Core #09
Core #10
Core #11
Core #12
Core #13
Core #14
Core #15
Core #16
Core #17
Core #18
Core #19
Core #20
Core #21
Core #22
Core #23
Core #24
Core #25
Core #26
Core #27
Core #28
Core #29
Core #30
Core #31
Core #32
Core #33
Core #34
Core #35
Core #36
Core #37
Core #38
Core #39
Core #40
Core #41
Core #42
Core #43
Core #44
Core #45
Core #46
Core #47
Core #48
Core #49
Core #50
Core #51
Core #52
Core #53
Core #54
Core #55
Core #56
Core #57
Core #58
Core #59
Core #60
Core #61
Core #62
Core #63

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 2 **Date of Coring:** 940809 **Logged by Keil Schmid** **Date Logged:** 940914

Location (FRF coordinates, m)
X (cross shore) = 311.8 **Y (long shore) =** 998.8 **Z=** -3.40 **(NGVD; top of core)**

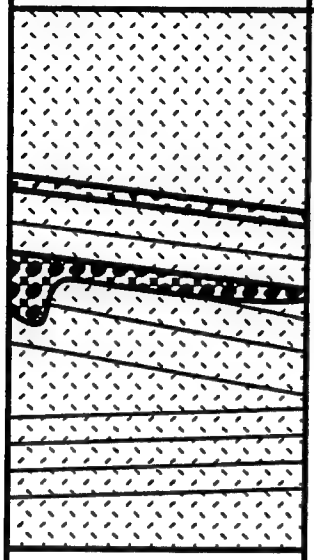


Lithology East / West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	2.0			Yellow-brown fine to medium quartz sand. Mean grain size 2.0 phi. Well sorted. Quartz ≈95%, calcium carbonate ≈6%. Trace amounts of heavy minerals.
			0.5	Faint contact (occurred during opening of core??). Yellow-brown medium quartz sand, mean grain size ≈1.7phi. Well sorted. Quartz ≈90%, calcium carbonate ≈10%. Slight fining upwards. Trace amount of heavy minerals.
	1.7			Gray fine quartz sand appears slightly cross-bedded. Iron staining on top of laminae, mean grain size ≈2.3 phi. Very well sorted. Quartz 95%, calcium carbonate 5%, increasing downwards. Trace amount of heavy minerals.
	2.3		1.0	Sharp contact. Cross-bedded medium to coarse sand with fine sand. Coarse grains are well rounded. Coarse laminae 75% quartz, 25% calcium carbonate, mean grain size1.0 phi, well sorted. Fine laminae 90% quartz, 10% calcium carbonate, mean grain size 2.0 phi, well sorted.
	1.0 / 2.0			Sharp contact, gray fine quartz sand cross-bedded with yellow brown medium/coarse quartz sand and shell fragments. Fining upwards section.
			1.5	Sharp contact, gray fine quartz sand, one planar laminae of medium sand. Quartz ≈95%, calcium carbonate 5%.
				Very sharp contact, coarse sand, no bedding. Quartz 70%, calcium carbonate 30%.
				Black-green mud. 95% clay, 5% sand, calcium carbonate, shells. Gorp section.

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 3 **Date of Coring:** 940809 **Logged by Keil Schmid** **Date Logged:** 940914

Location (FRF coordinates, m)
X (cross shore) = 160.3 **Y (long shore) =** 1000.7 **Z=** -1.90 **(NGVD; top of core)**

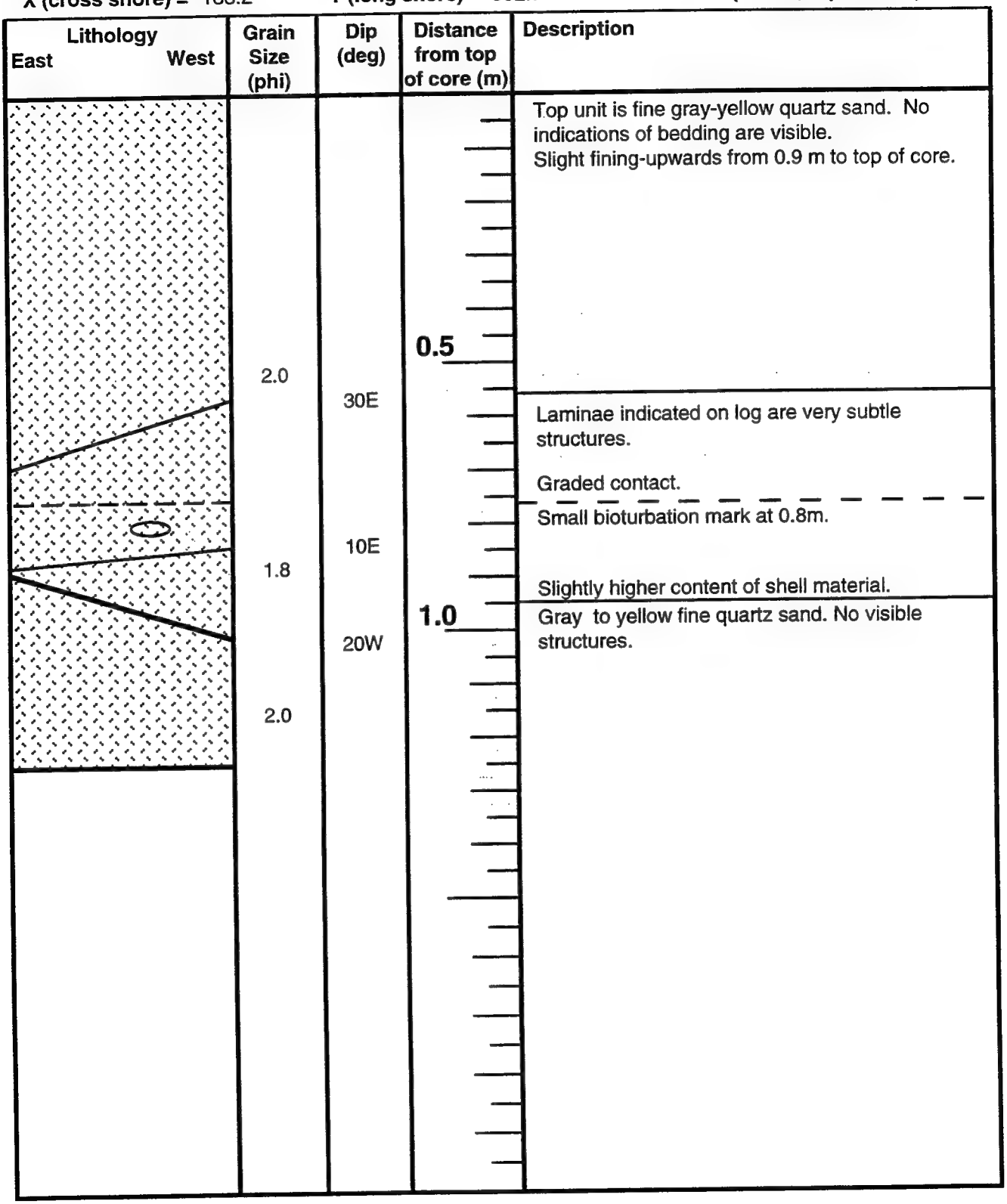


Lithology East / West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
				Gray-yellow fine quartz sand. No noticeable structure. 95% quartz, 5% calcium carbonate. Lower contact dips 12° towards shore (W).
	2.0			
	1.8	12 W		Medium sand. 90% quartz 10% calcium carbonate. Contacts dip 12°.
	2.2	12 W		
	0.5	14 W		Gray fine quartz sand. Upper contact 12°W lane contact 14°W.
		15 W		
		18 W	0.5	Coarse sand and gravel/pebble, poorly sorted, upper contact 14°W, lower contact 15°W. Large slump area on side of core which could be an artifact of coring process
	2.0	5 E		Gray fine quartz sand upper contact 15·W, slight indications of cross beds dipping 18°W, below 0.55m weak cross-beds dip E at 5°.

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 4 top **Date of Coring:** 940811 **Logged by Keil Schmid** **Date Logged:** 940915

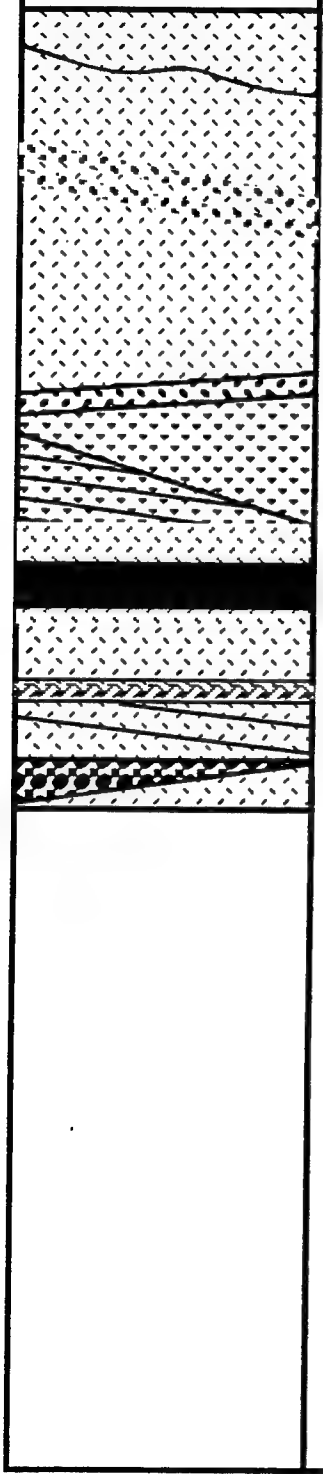
Location (FRF coordinates, m)
X (cross shore) = 183.2 **Y (long shore) =** 992.7 **Z=** -1.52 **(NGVD; top of core)**



Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 4 bottom **Date of Coring:** 940811 **Logged by Keil Schmid** **Date Logged:** 940916

Location (FRF coordinates, m)
X (cross shore) = 183.2 **Y (long shore) =** 992.7 **Z=** -1.52 **(NGVD; top of core)**

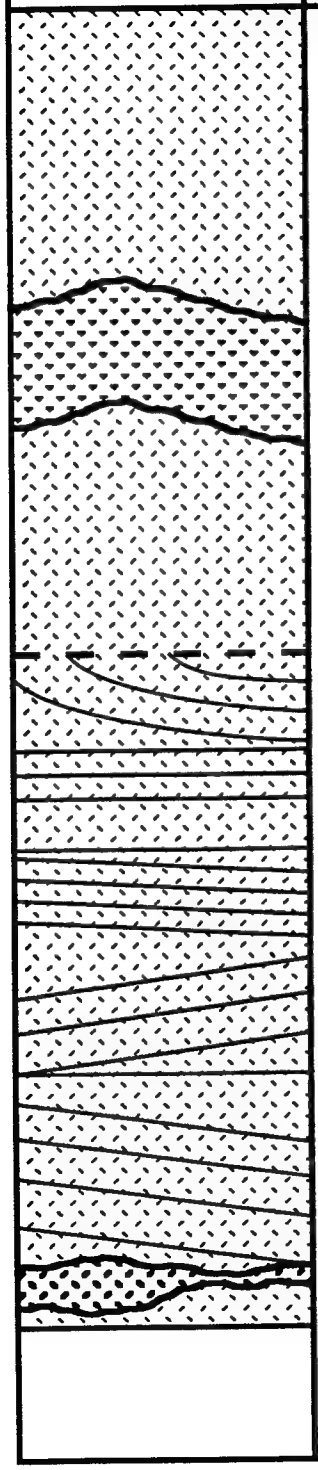


Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.9	12W		Yellow-gray fine quartz sand.
	2.1	15W	1.50	Gray fine sand with 2 thin medium sand laminae dipping 15°. 90% quartz, 10% fine shell, black stained.
	1.5	5E		Medium shelly quartz sand.
	1.8			Medium to fine quartz sand.
	1.7	25W		
	10	10W		Black stained shelly quartz sand. Quartz 85%, calcium carbonate 15%.
	2.2	0	2.00	Olive green clay. Slight lag deposit on top contact. Gorp.
	3.0	0		Silty (?) fine sand with horizontal black shell laminae and one silty olive sand lamina.
	0.5	12W		
	2.2	10E		Coarse sand to gravel.
				Fine gray sand.

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 5 **Date of Coring:** 940811 **Logged by Keil Schmid** **Date Logged:** 940914

Location (FRF coordinates, m)
X (cross shore) = 206.0 **Y (long shore) =** 991.8 **Z=** -1.80 **(NGVD; top of core)**

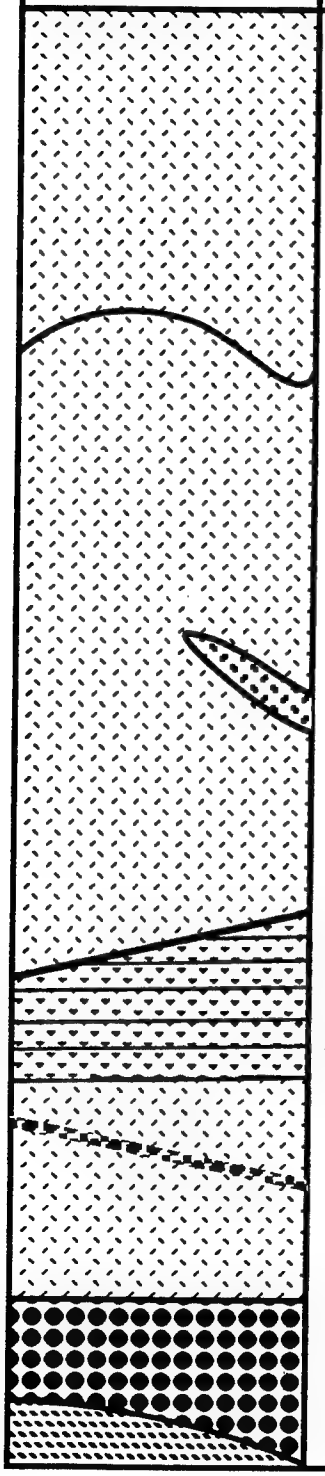


Lithology East / West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	2.1			Light gray fine quartz sand. Slight increase in grain size down section. Fining upwards sequence.
	2.0			
	1.9		0.5	
	1.8			Yellow-gray fine to medium quartz sand. Large mottled area, could be an artifact of the coring process.
				Contacts in the upper 0.75 to 0.8m of the core may be artifacts of coring.
	1.9			
			1.0	Gray fine quartz sand with laminations of darker grains. Fining upwards sequence.
		20W		
		0		
	2.0			
		5W		
		10E		
			1.5	
				Gray fine quartz sand . Contact is flat with upper bed. Lower contact is dipped 10°.
	2.2	10W		
	0.7			Yellow medium quartz sand. No structures.
	2.2			Black stained fine quartz sand, smells estuarine.

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 6 **Date of Coring:** 940811 **Logged by Keil Schmid** **Date Logged:** 940915

Location (FRF coordinates, m)
X (cross shore) = 169.8 **Y (long shore) =** 940.9 **Z=** -1.40 **(NGVD; top of core)**

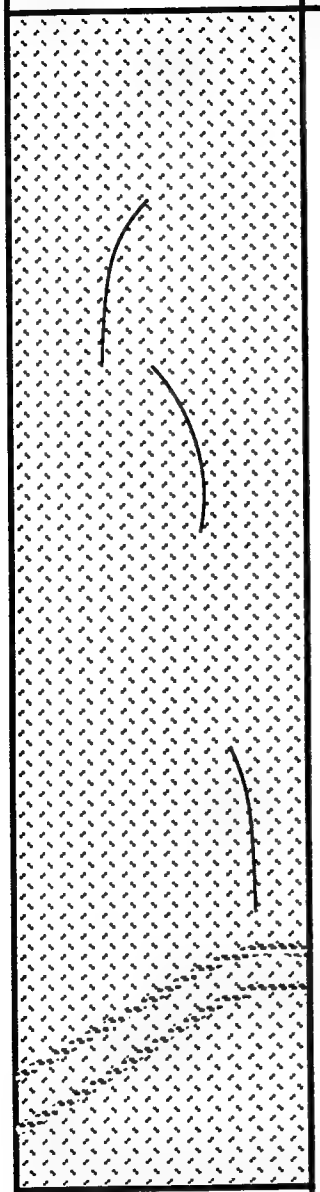


Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
			Fine quartz sand. No visible structures. Dry at time of logging.
2.2			
		0.5	
			Gray fine quartz sand with no obvious structures.
1.8			
		1.0	
1.6			Yellow medium sand. Structure is distorted.
2.2			Gray fine quartz sand with no obvious structures.
2.0	30E		
	5E		Contact 30° Fine to medium quartz sand, faint laminae with 5° dip. Fining upwards.
1.8			
	5E	1.5	
1.9			Fine quartz sand with very faint horizontal laminae. One coarse layer dips 20° in opposite direction as others found in core.
0	20W		
1.9	0		
			Horizontal contact. Coarse shelly quartz sand. Abundant lithoclasts and black shells.
-1.0			
			Black poorly sorted very fine to medium quartz sand with heavy minerals. Possibly estuarine.
2.0	20W	2.0	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 7 top **Date of Coring:** 940811 **Logged by Keil Schmid** **Date Logged:** 940929

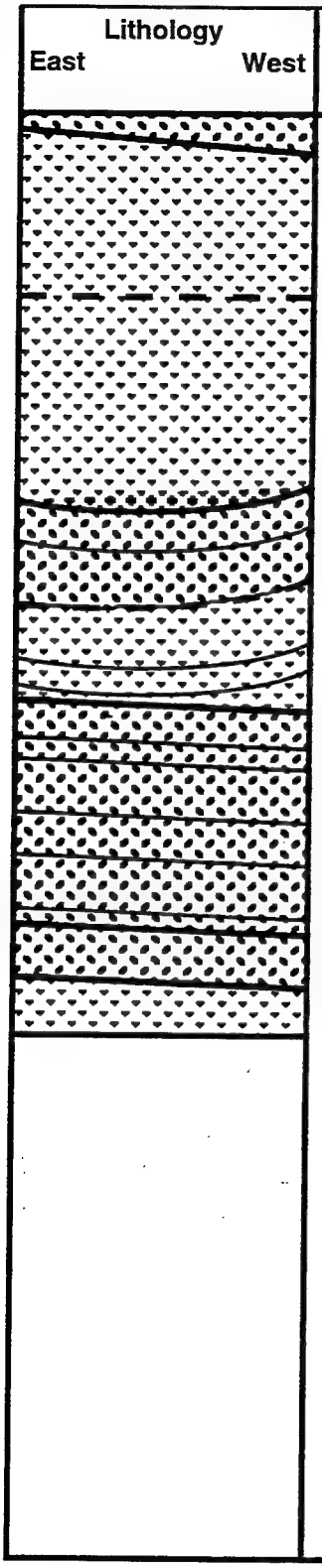
Location (FRF coordinates, m)
X (cross shore) = 207.9 **Y (long shore) =** 941.5 **Z=** -1.77 **(NGVD; top of core)**

Lithology East / West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	2.0		0.25	Gray-yellow fine quartz sand appears to fine upwards slightly. Above 0.60m core has a mottled look, perhaps due to bioturbation or deformation during coring. Mottled areas are slightly darker. Overall 90% quartz, 10% calcium carbonate, well sorted, unimodal.
			0.50	
		40W 40W		Very faint, steeply dipping (40°) laminae, may be artifacts of coring. Laminae are slightly coarser.
	1.8		0.75	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 7 bottom **Date of Coring:** 940811 **Logged by Keil Schmid** **Date Logged:** 940929

Location (FRF coordinates, m)
X (cross shore) = 207.9 **Y (long shore) =** 941.5 **Z=** -1.77 **(NGVD; top of core)**

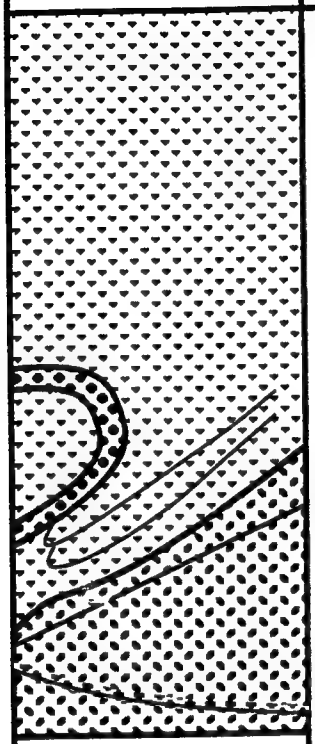


Lithology East — West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.8	10W		Top 2-4 cm is yellow/brown medium quartz sand.
	2.0			Fairly sharp contact dipping10° W. Top portion of a fining-upwards sequence. Gray fine to medium quartz sand with no structures evident.
	1.8		1.00	Gray medium quartz sand witha calcium carbonate content of up to 25 -30 % from about 1.1 m to 0.95 m.
	1.4	5E		
	1.6	5E		Medium quartz grain sand with two thin coarser laminae. Curved contact dips 5° E. Coarsening upward sequence.
	2.0	4E		Medium/fine gray quartz sand. Graded contact with upper lithology. Several heavy mineral laminations dipping 4-5° E.
		4E	1.25	
		5W		
	1.8	5W		Medium yellow/brown quartz sand. Upper contact dips 5°. Heavy mineral laminations also dip 5°. Section possibly fines upwards?
		5W		
	1.6	5W		
	1.5			Medium grain, shelly, black stained, quartz sand. Contact dips 5° W.
	2.0	5W		
			1.50	Medium/fine black stained quartz sand. Sharp contact dipping at 5° W.

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 8 top **Date of Coring:** 940811 **Logged by Keil Schmid** **Date Logged:** 940920

Location (FRF coordinates, m)
X (cross shore) = 169.2 **Y (long shore) =** 960.7 **Z=** -1.32 **(NGVD; top of core)**

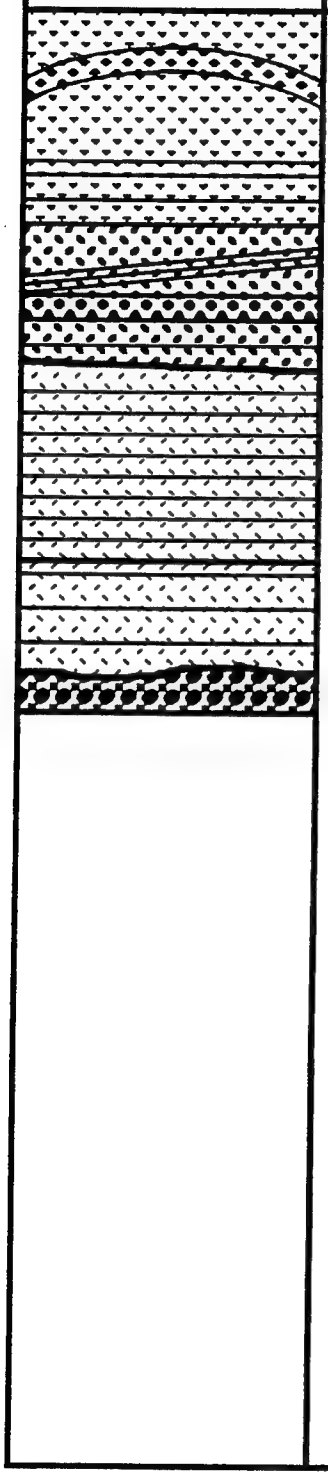


Lithology East — West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	2.0			Top ≈0.5m structureless gray-yellow medium to fine quartz sand. No observable bedding planes. Quartz 90%, calcium carbonate 10%.
	1.8	50E	0.50	0.5 to 0.75m — strange looking structure (disturbed? during coring) almost an overturned anticline with slightly coarser sediment. Steep laminations below the structure.
	1.7			Coarsening upwards sequence of structureless medium quartz sand. Increasing shell contact upwards, 15% calcium carbonate.
	1.8 1.9	30W	1.00	Extremely faint contact. Real?

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 8 bottom **Date of Coring:** 940811 **Logged by Keil Schmid** **Date Logged:** 940920

Location (FRF coordinates, m)
X (cross shore) = 169.2 **Y (long shore) =** 960.7 **Z=** -1.32 **(NGVD; top of core)**

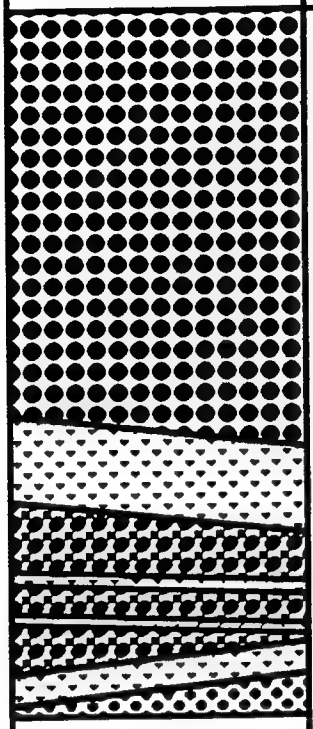


Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
1.9			Medium fine quartz sand, no visible structures.
1.7			Anticlinal looking laminae of slightly coarser quartz sand. (medium)
2.0	0		Yellow gray fine-medium quartz sand with faint horizontal dark laminations.
1.8	10E		Yellow-brown medium quartz sand with slightly darker thin laminae at 10°.
1.6			
1.8	0	2.00	Yellow-brown medium to coarse quartz sand, no structure visible.
	5W		Yellow brown medium quartz sand with slightly darker thin laminae at 0°
2.0	0		Sharp contact dipping 5° W. Gray fine sand with thin horizontal laminae.
	0		
2.1			Slightly darker fine sand with no laminae.
0.5		3.00	Sandy gravel with darker colored shells at the bottom of core.

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 9 **Date of Coring:** 940818 **Logged by Keil Schmid** **Date Logged:** 940920

Location (FRF coordinates, m)
X (cross shore) = 135.0 **Y (long shore) =** 940.0 **Z=** -0.26 **(NGVD; top of core)**

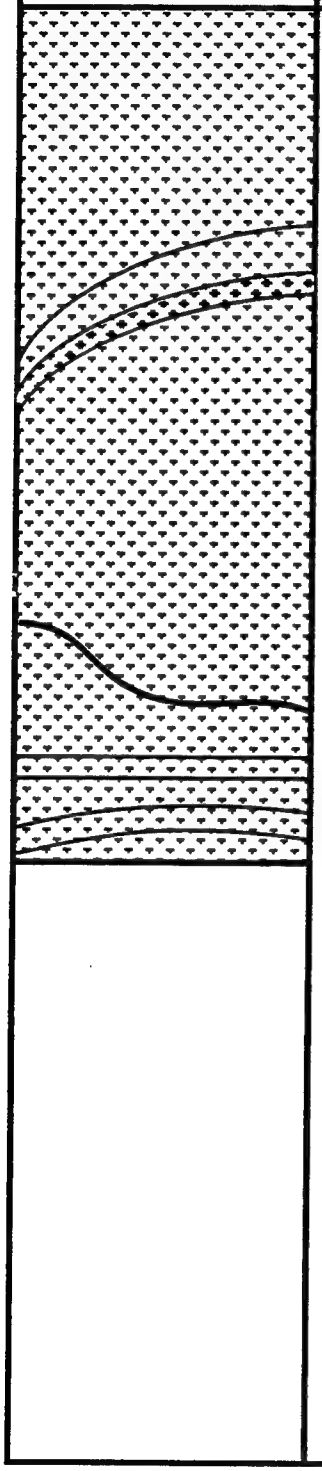


Lithology East / West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	-1.25			Sandy gravel with no structures evident. Large grains are a mix of shells and lithoclasts. Poor sorting.
	-1.5		0.5	Moderately sorted.
	-1.0			
	-1.8	10 W		Structureless gray sand with occasional gravel sized grains.
		10 W		Sandy gravel, also structureless.
	-0.5	5 W		
	1.8	5 W		Thin bed of medium to fine quartz sand. (gray)
	1.7	5 W		Sandy gravel.
	0	10 E		Thin gray fine quartz sand.
	2.0	10 E	1.0	Grey fine medium quartz sand, structureless contacts are both dipping 10°E
	1.0			Gravelly sand, poor sorting.

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 10 **Date of Coring:** 940818 **Logged by Keil Schmid** **Date Logged:** 940923

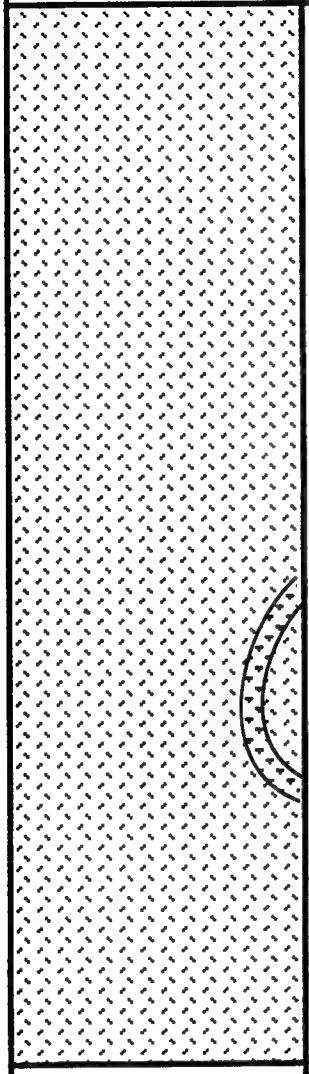
Location (FRF coordinates, m)
X (cross shore) = 190.2 **Y (long shore) =** 940.0 **Z=** -1.69 **(NGVD; top of core)**

Lithology East / West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	2.0			Yellow-gray fine/medium quartz sand. No structures evident. One slightly coarser laminae and an ever-so-slight dark layer dip and curve to the east at 15°. The rest of this section looks mottled, perhaps due to bioturbation. A general fining upwards trend is present.
	1.7	15 E		
			0.5	
	1.9			
	1.8		1.0	
	2.1			Contact here looks erosional, with slight iron staining.
		0		
	1.9	5 E		Fining upwards sequence. Top part is gray, lower portion is yellow brown. Top has horizontal laminations. Lower part is dipping slightly offshore.

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 11 top **Date of Coring:** 940818 **Logged by Keil Schmid** **Date Logged:** 940928

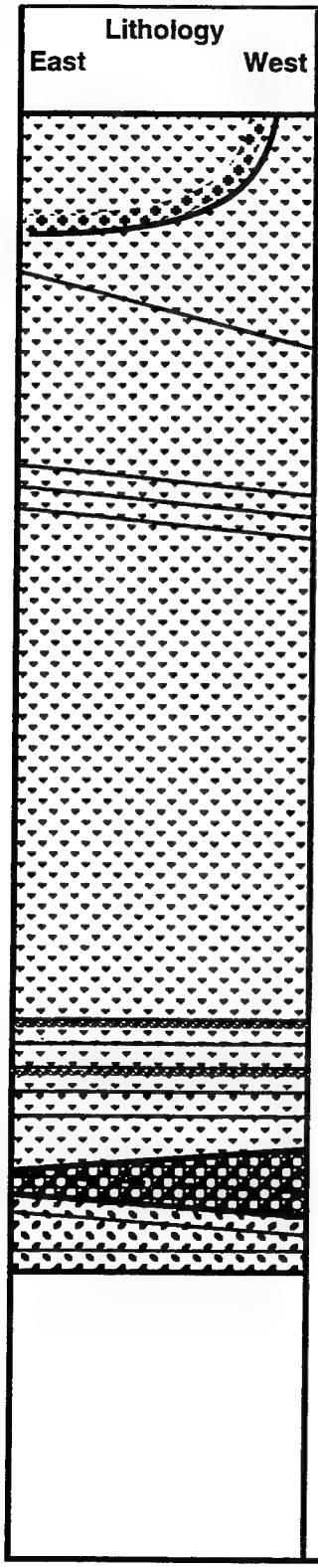
Location (FRF coordinates, m)
X (cross shore) = 220.2 **Y (long shore) =** 940.0 **Z=** -2.07 **(NGVD; top of core)**

Lithology East / West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	2.0			Gray/yellow fine quartz sand. No structures evident. 95% quartz, 5% shell. Very homogenous.
			0.25	No structures evident.
	2.0			
	1.8			
			0.50	Small curved lamina, slightly coarser, looks like a filled burrow.
	1.8			
				No structures evident.
	2.0		0.75	
				(This core used as a test for peels.)

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 11 bottom **Date of Coring:** 940818 **Logged by Keil Schmid** **Date Logged:** 940926

Location (FRF coordinates, m)
X (cross shore) = 220.2 **Y (long shore) =** 940.0 **Z=** -2.07 **(NGVD; top of core)**

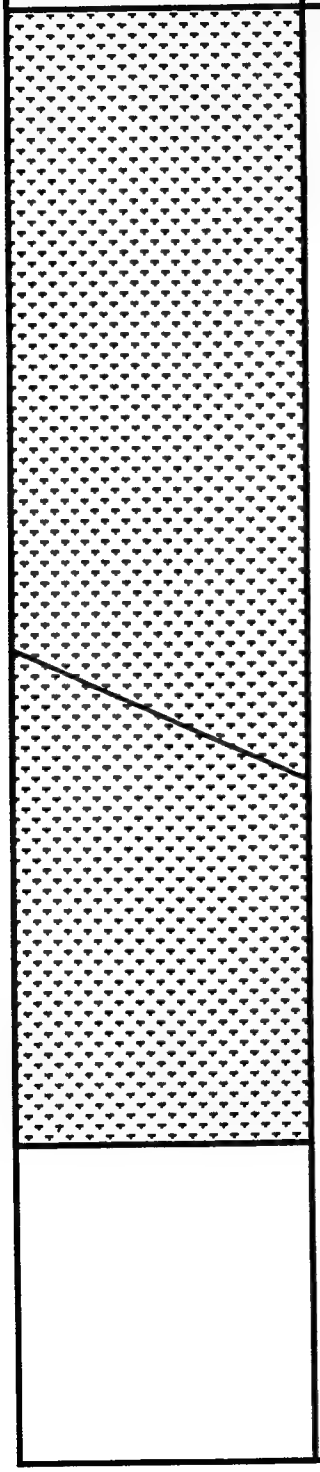
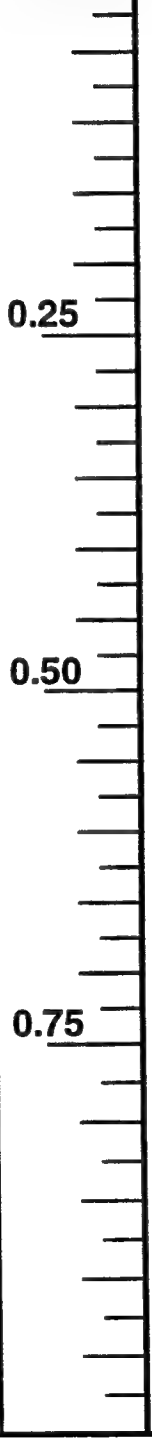


Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
1.9			Erosional contact. Yellow-gray fine to medium quartz sand. Quartz 90%, calcium carbonate 10%. Slightly coarser at contact (lag). No structures evident.
	20 W		Gray fine to medium quartz sand. Very faint bedding structures at 0.9, 1.15 and 1.20 m.
		1.00	
2.0	5 W 5 W 5 W		
		1.25	
1.7	0		
1.7	0		Horizontal medium to slightly coarse shelly stringers. Shells are angular. Delicate laminations are about 5mm thick.
0.7	5 E	1.50	Coarse angular and delicate shells overlying coarse quartz sand and rounded shells. Contact dips 5°W.
1.6	5 W 5 W 0		Yellow medium quartz sand with horizontal laminations having slightly higher concentration of heavy minerals.

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 12 top **Date of Coring:** 940818 **Logged by Keil Schmid** **Date Logged:** 940926

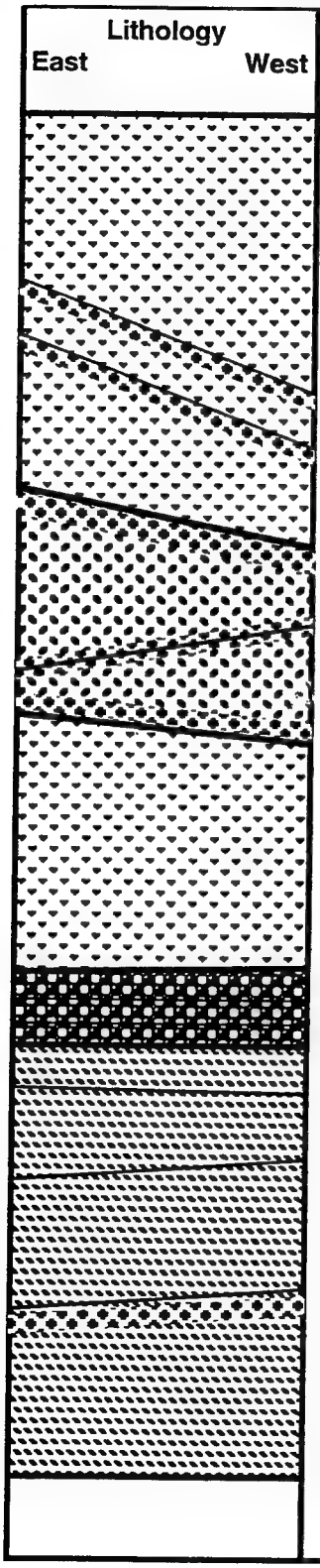
Location (FRF coordinates, m)
X (cross shore) = 240.6 **Y (long shore) =** 940.0 **Z=** -2.35 **(NGVD; top of core)**

Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	 2.0		 0.25 0.50 0.75	Extremely uniform gray-yellow fine-medium quartz sand. Slightly mottled laminations, look like bioturbation effects or coring artifact. One visible laminae of slightly darker (heavy mineral) sediment at 0.5m, dips 30°W.

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 12 bottom **Date of Coring:** 940818 **Logged by Keil Schmid** **Date Logged:** 940926

Location (FRF coordinates, m)
X (cross shore) = 240.6 **Y (long shore) =** 940.0 **Z=** -2.35 **(NGVD; top of core)**

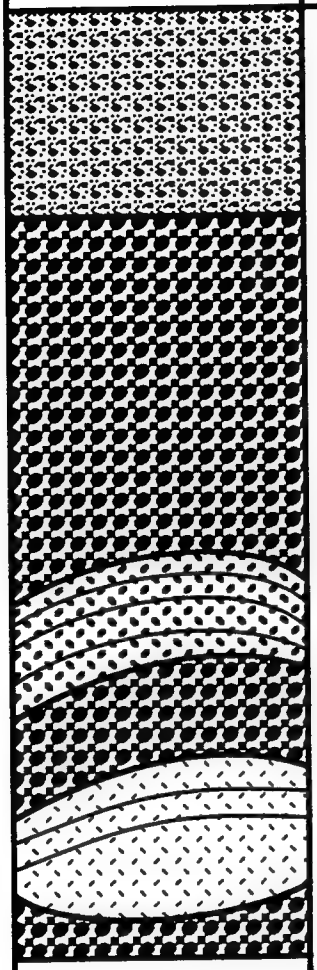


Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
2.0			Medium-fine gray quartz sand.
1.6	20 W		
2.0			Two slightly coarser laminae dip 20°W.
1.6	20 W	1.00	
2.0			Fairly sharp contact.
1.5	15 W		Gray/yellow medium quartz sand with coarse upper and lower contacts both dipping 15°W. One coarse laminae dips 15°E.
1.8			
1.5	15 E		
1.8			
1.5	10 W		
2.0			Fining upwards mdium/fine quartz sand, gray in color, upper contact very sharp dipping 10°W, lower contact slope and almost horizontal.
		1.25	
1.5	2 E		
1.2			Fining upwards coarse quartz sand (yellow), gradual change to finer grained, horizontal bedding?
0.5	0 E		
	5 W		
1.9			Fining upwards yellow-gray medium to medium fine quartz sand, several lineations dip 10°E. One at 1.65m is noticeably coarser. Signs at 1.45m of a west dipping lineation, very weak.
	10 E	1.50	
	10 E		
	10 E		
1.6			

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 13 **Date of Coring:** 940819 **Logged by Keil Schmid** **Date Logged:** 940926

Location (FRF coordinates, m)
X (cross shore) = 138.6 **Y (long shore) =** 991.1 **Z=** -0.52 **(NGVD; top of core)**

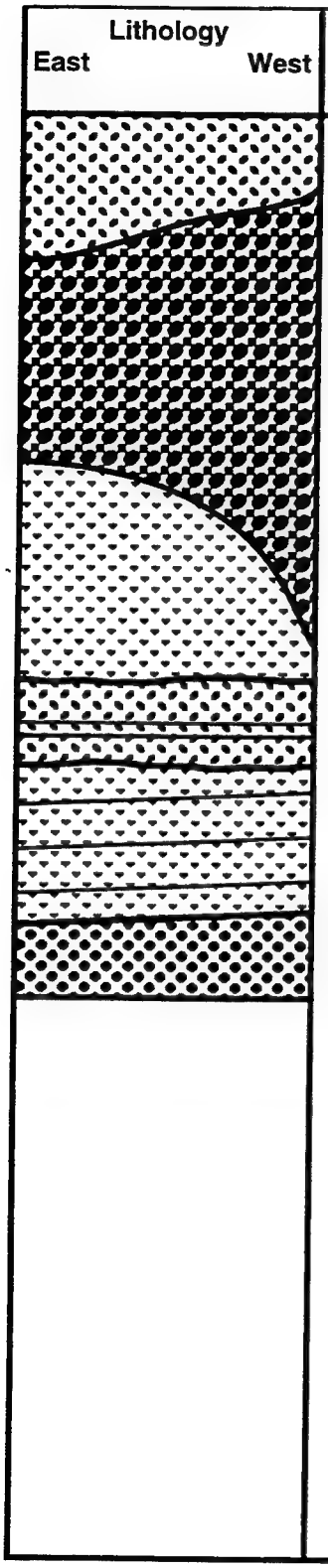


Lithology East / West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.5			Yellow-brown medium and coarse sand. Bimodal, poorly sorted, no structures. Section does not fine upwards or downwards.
	-1.5		0.5	Fairly sharp contact. Yellow/brown sandy gravel. Slight coarsenting upwards. No preserved structures. Poor sorting, bimodal.
	-0.5	0 ?		
	1.7			Sharp contact, curved as if coring disturbed flat contact. Gray/yellow medium quartz sand.
		0 ?	1.0	
	-1.0			Sharp contact, curved, as above, poor sorting. Yellow/brown sandy gravel, no structures preserved . Slight coarsening upwards. Bimodal.
		8 E		
	2.0	8 E		Gray fine quartz sand, slightly dipping laminations, at 8°E. May be disturbed slightly.
	-1.0			Sharp erosional (?) contact. Clean yellow/brown gravel, no fine sand. Unimodal.

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 14 **Date of Coring:** 940819 **Logged by Keil Schmid** **Date Logged:** 940927

Location (FRF coordinates, m)
X (cross shore) = 146.6 **Y (long shore) =** 991.0 **Z=** -1.08 **(NGVD; top of core)**

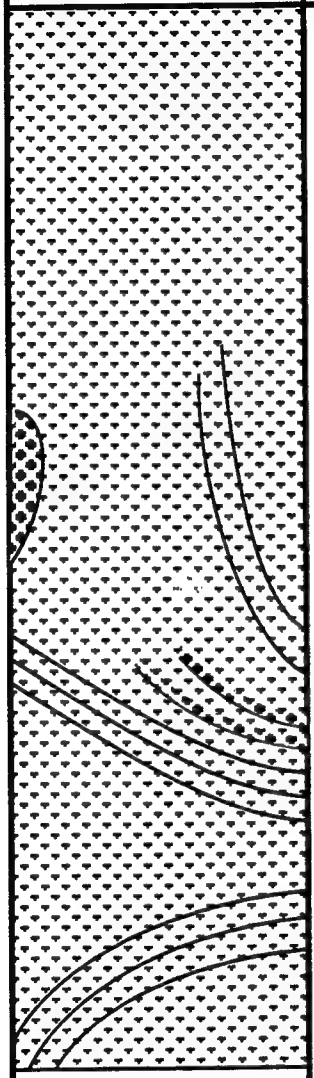


Lithology East / West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.6			Yellow-brown medium and coarse quartz sand. Poorly sorted, bimodal.
	0	30 E		
				Sharp contact. Fining upwards sequence(?) of sandy gravel, bimodal. Large pebbles are well rounded lithoclasts. No apparent structures.
	-1.0			
			0.5	
	-1.5			
		70 W		Sharp, very steeply dipping contact (70°W) Structureless, yellow medium-fine quartz sand with above-average concentration of heavy minerals. Very homogenous. Unimodal.
	2.0			
	1.2			
	1.6	0		Yellow-brown medium quartz sand matrix with embedded coarse sand to gravel-size grains. Bimodal, coarsens upwards to sharp horizontal contact. Slight horizontal laminations.
	1.9	5 E	1.0	
		5 E		
		5 E		Gradational horizonatal contact. Gray medium-fine quartz sand, fining upwards, with very faint laminations dipping 5°E.
	1.7	5 E		
	1.2			Slightly dipping (5°E) gradational contact. Yellow-brown medium to coarse quartz sand.

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 15 top **Date of Coring:** 940819 **Logged by Keil Schmid** **Date Logged:** 940930

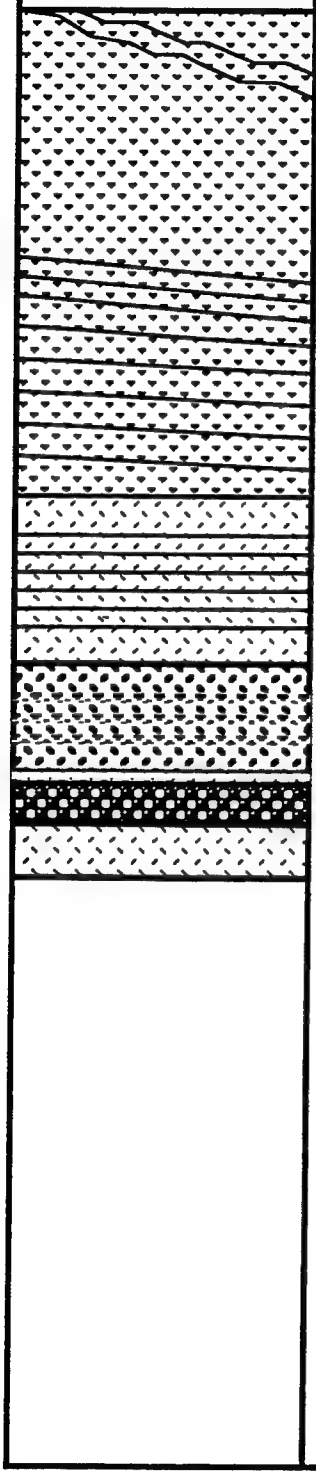
Location (FRF coordinates, m)
X (cross shore) = 219.9 **Y (long shore) =** 992.2 **Z=** -1.74 **(NGVD; top of core)**

Lithology East / West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	2.0	2 W 3 E 0 5 E 5 E 5 W 5 W	0.25 0.50 0.75	Gray-yellow medium-fine quartz sand. Slightly higher percent of shells than other cores with similar sediments. Shells are delicate and angular. Core has a very mottled look. Coarser shells are randomly distributed.
	1.8			Same unit. Has deformed structures that dip opposite ways and are curved as if caused by coring process. Laminae are slightly darker color and at 0.52m slightly coarser grains are present.
	1.9			

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 15 bottom **Date of Coring:** 940819 **Logged by Keil Schmid** **Date Logged:** 940930

Location (FRF coordinates, m)
X (cross shore) = 219.9 **Y (long shore) =** 992.2 **Z=** -1.74 **(NGVD; top of core)**

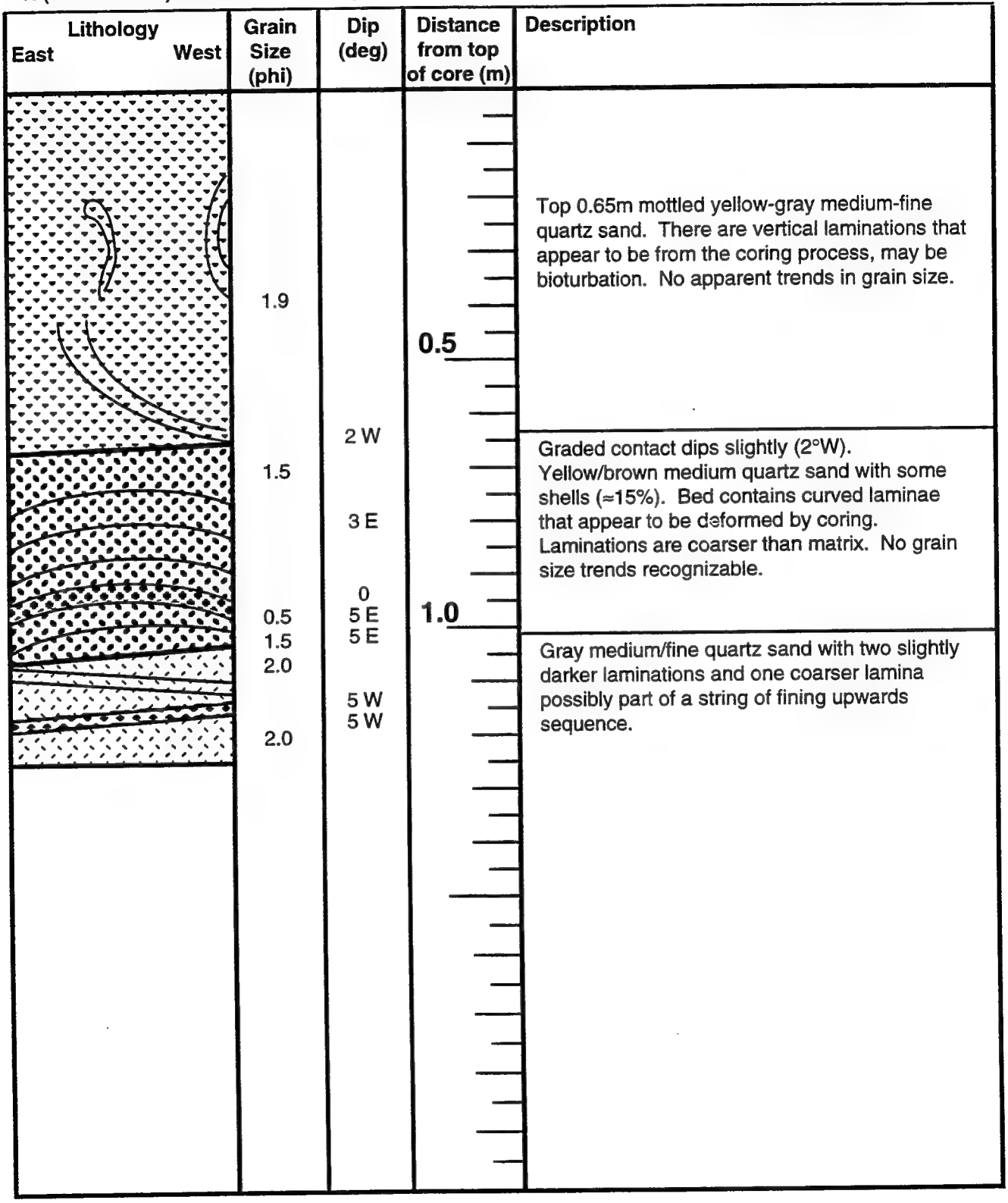


Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
1.8			Yellow-gray medium fine quartz sand. Very faint, darker laminations. No trends in grain size.
	30		
	7		
	5	1.00	
	3		
	3		
1.8	3		
	0		
	0		Fairly sharp horizontal contact . Gray fine quartz sand with horizontal laminae.
2.0	0		
	0		
		1.25	Fairly sharp contact (horizontal) yellow/brown medium quartz sand with horizontal beds of coarse quartz sand and one fine horizontal bed at 1.24-1.26m.
1.3			
1.8	0		
1.0	0		Sharp contact with fine horizontal bed yellow-brown coarse shelly quartz sand. No structures evident.
1.8			Sharp horizontal contact. Yellow-gray fine quartz sand.

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 16 **Date of Coring:** 940819 **Logged by Keil Schmid** **Date Logged:** 940927

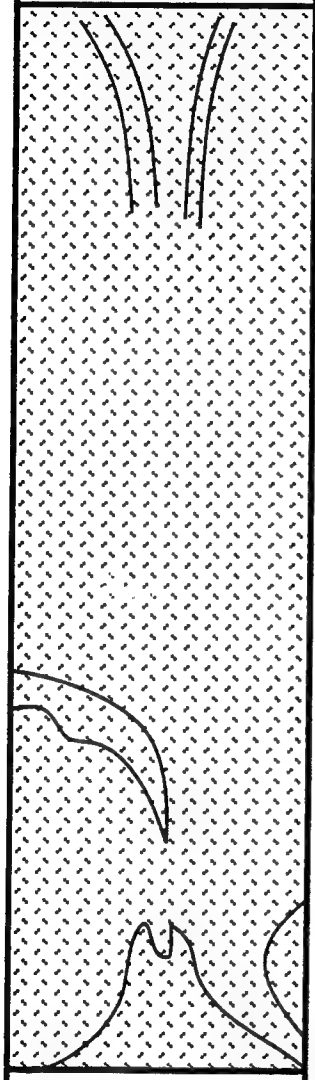
Location (FRF coordinates, m)
X (cross shore) = 240.8 **Y (long shore) =** 992.6 **Z=** -2.08 **(NGVD; top of core)**



Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 17 top **Date of Coring:** 940819 **Logged by Keil Schmid** **Date Logged:** 940928

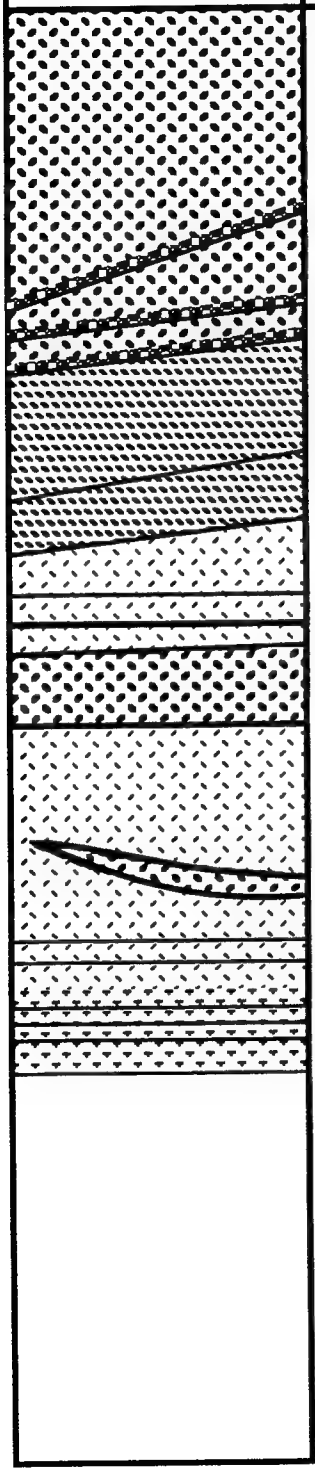
Location (FRF coordinates, m)
X (cross shore) = 242.4 **Y (long shore) =** 992.6 **Z=** -2.23 **(NGVD; top of core)**

Lithology East / West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	2.0 1.7		0.25 0.50 0.75	One big slightly fining upward deposit, if there were any structures they were destroyed in the coring process. There is a mottled look which could be bioturbation.

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 17 botom **Date of Coring:** 940819 **Logged by Keil Schmid** **Date Logged:** 940928

Location (FRF coordinates, m)
X (cross shore) = 242.4 **Y (long shore) =** 992.6 **Z=** -2.23 **(NGVD; top of core)**



Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.7			Fining-upward sequence. Yellow-brown medium quartz sand, up to 15% calcium carbonate. Has slightly coarser cross laminae, all dipping east.
		30 E		
		10 E		
	1.4	10 E		
			1.00	
				Weak contact, dipping 10°E. Bimodal medium-fine to coarse quartz sand. Faint laminations dip 15°E.
	1.5	15 E		
		10 E		
				Strong contact dips 10°E. Gray fine quartz sand, fines upwards.
	2.0	0		
	1.8			
	1.5	5 E		
				Strong contact, 5°E. Yellow-brown medium quartz sand, upward fining, no real structures.
	1.2		1.25	
		0		
	2.1			
				Strong contact. Gray fine quartz sand. Upward fining? One cross bed dipping 5°W, some faint laminae that are horizontal.
		5 W		
	1.8			
			1.50	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 18 top **Date of Coring:** 940819 **Logged by Keil Schmid** **Date Logged:** 940930

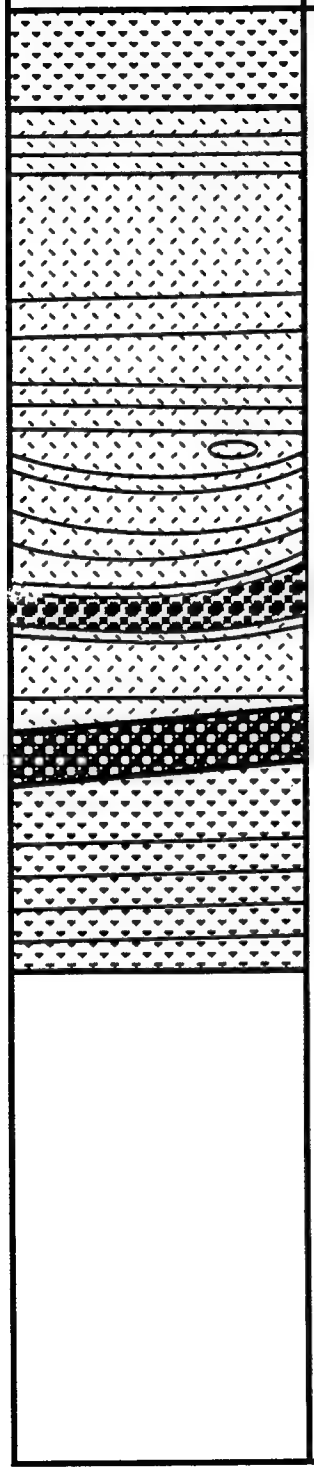
Location (FRF coordinates, m)
X (cross shore) = 220.7 **Y (long shore) =** 960.0 **Z=** -1.86 **(NGVD; top of core)**

Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.8		0.25	Yellow-brown medium-fine quartz sand moderately well sorted with no visible structures. There are some black shells (2%) that are slightly larger than the modal size. No signs of mottling.
	1.8		0.50	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 18 bottom **Date of Coring:** 940819 **Logged by Keil Schmid** **Date Logged:** 940930

Location (FRF coordinates, m)
X (cross shore) = 220.7 **Y (long shore) =** 960.0 **Z=** -1.86 **(NGVD; top of core)**

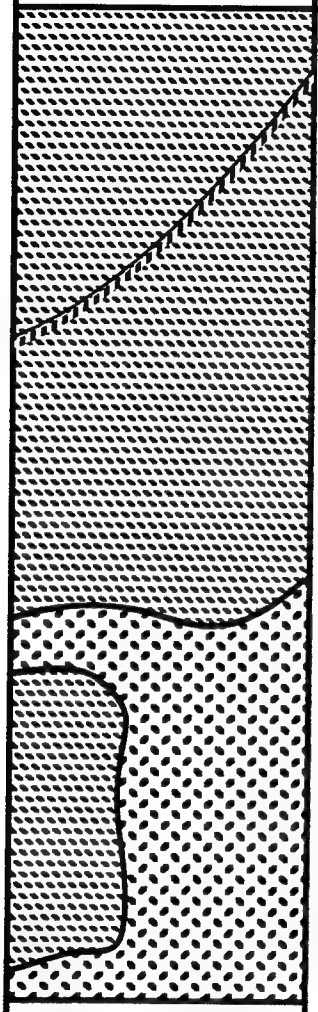


Lithology East — West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.8			Yellow-brown medium-fine quartz sand structureless, as is top of core.
	2.0			Graded contact, change in color is fairly sharp. Yellow-gray fine quartz sand. Fining upward section. Iron stain at 0.80m.
		5 E 5 E	0.75	
		5 W 5 W 0		0.90m coarse lag below, heavy mineral laminae. One large shell present. These laminae are wavy (below 90cm). Sediment is also coarser below 0.90m.
	1.8		1.00	
	1.0	10 E 10 E		Sharp contact (dips 10°E) looks erosional (slight wavy). Yellow-gray fine to medium quartz sand with darker laminations dipping 5°E.
	1.8	5 E 5 E 5 E 5 E		

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 19 top **Date of Coring:** 940819 **Logged by Keil Schmid** **Date Logged:** 941002

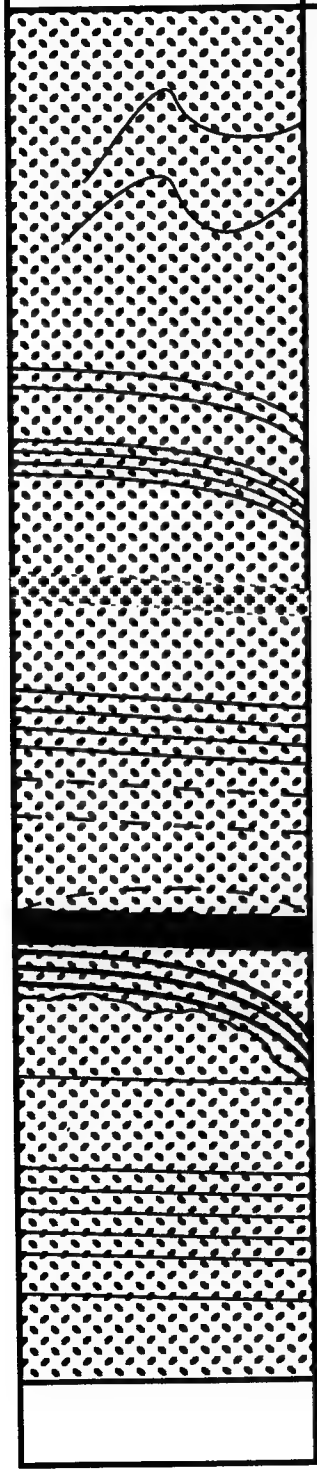
Location (FRF coordinates, m)
X (cross shore) = 205.6 **Y (long shore) =** 960.5 **Z=** -1.83 **(NGVD; top of core)**

Lithology East / West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.9 1.6 1.9 1.6		0.25 0.50	Gray/yellow medium to medium-fine quartz sand. Coarsening upwards trend in grain size. One very steep cross-bed, nearly linear. Very strange contact. Yellow-brown medium quartz sand with a "chunk" of the above sediment on the off-shore (E) side of core. This is assumed to be a disturbance from the coring process.

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 19 bottom **Date of Coring:** 940819 **Logged by Keil Schmid** **Date Logged:** 941003

Location (FRF coordinates, m)
X (cross shore) = 205.6 **Y (long shore) =** 960.5 **Z=** -1.83 **(NGVD; top of core)**

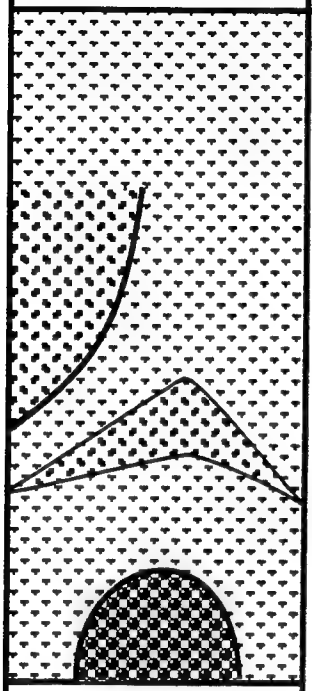


Lithology East — West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.6		0.75	Yellow/brown medium quartz sand with darker mottled pockets. Structures begin at about 0.80m.
	1.9			
	1.9	10 W	1.00	Several curved cross-beds and laminae present, dipping 10°W.
		10 W		
	1.4	5 W		Coarser bed dips 5°W — no sharp contacts at upper and lower boundary.
		10 W		Linear dark lamina dips 10°W.
			1.25	
	1.9	10 W		Dark stained sand above contact.
		5 W		Very sharp contact at 5°W. Thin bed of olive-brown clay (mud)
	8.0?	5 W		Very sharp contact dips 5°W.
		20 W		Yellow-brown medium quartz sand with clayey cross laminae. Below 125 cm gray medium-fine quartz sand with subtle, darker laminae. This whole sequence seems to be a coarsening-upwards sequence.
	1.6	20 W		
		8 W	1.50	
	1.8	7 W		
		7 W		
		7 W		

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 20 top **Date of Coring:** 940819 **Logged by Keil Schmid** **Date Logged:** 941003

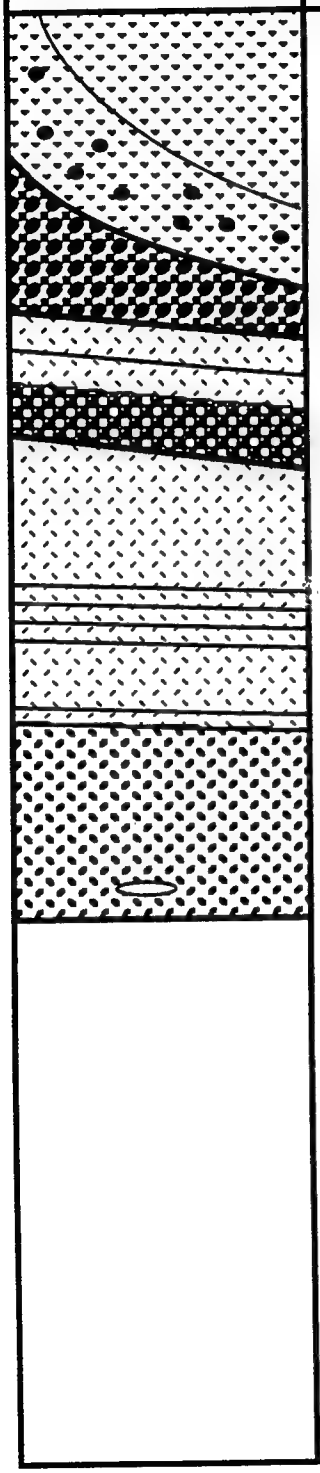
Location (FRF coordinates, m)
X (cross shore) = 145.7 **Y (long shore) =** 961.3 **Z=** -0.60 **(NGVD; top of core)**

Lithology East / West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.9			Gray-yellow heavily mottled fine to medium quartz sand. Mottled areas are yellow-brown medium quartz sand. Structures appear to be caused by coring(?). Possibly a fining-upward sequence.
	1.7		0.25	
	1.0		0.50	Bottom contact with coarse sediment, plume shaped, with sharp boundaries.

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 20 bottom **Date of Coring:** 940819 **Logged by Keil Schmid** **Date Logged:** 941004

Location (FRF coordinates, m)
X (cross shore) = 145.7 **Y (long shore) =** 961.3 **Z=** -0.60 **(NGVD; top of core)**

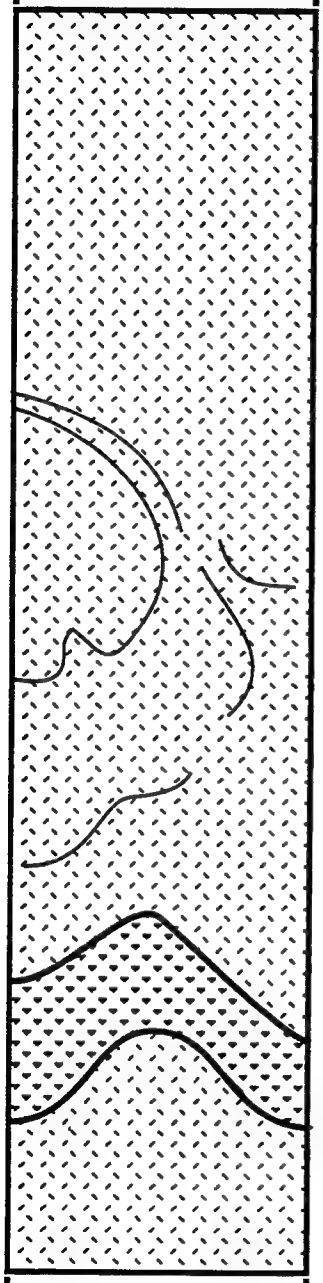


Lithology East / West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.8			Yellow-brown medium-fine quartz sand with a nearly vertical bed (dips 70°) of poorly-sorted (bimodal) very coarse sand in fine-medium sand matrix. (Disturbed?)
	1.5			
	0.8	25 W		
			0.75	Cross-bed of gravelly sand (yellow-brown) upper contact is fairly gradational, bottom contact is very sharp.
	1.9	10 W		
		10 W		
	1.2	10 W		Very sharp contact (dips 10°W). Yellow-gray fine fine sand with a planar-dipping region having a slight color change.
		20 W		
	1.9			Gradational contact (dips @ 10°W). Yellow-brown poorly-sorted bimodal coarse sand.
		2 W		
		2 W		
	1.7		1.00	Fairly sharp contact (dips 20°W). Fining-upward unit top is gray-yellow fine quartz sand. Lower portion is yellow medium quartz sand. Several weak laminae are present.
		7 W		
	1.5			

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 22 top **Date of Coring:** 940819 **Logged by Keil Schmid** **Date Logged:** 941004

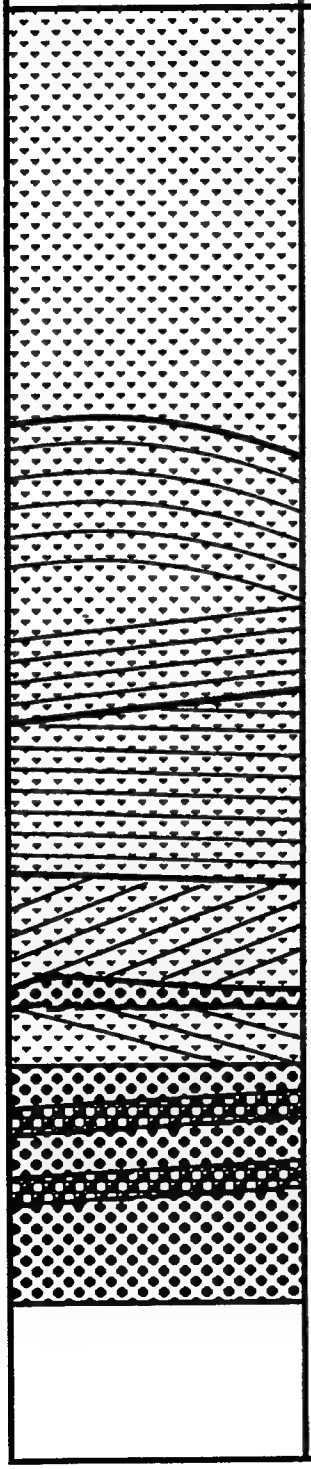
Location (FRF coordinates, m)
X (cross shore) = 939.4 **Y (long shore) =** 230.0 **Z=** -2.10 **(NGVD; top of core)**

Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.9		0.25	Grey-yellow mottled fine quartz sand. Evidence of flow structures (from coring?). Some grain size variation from 0.65 m to 0.80 m, otherwise homogenous. No apparent bedding structures, except for possible deformed cross-bed from 0.65 m to 0.80 m. No noticeable grain-size trends.
			0.50	
	1.7		0.75	Boundary marked by color change. Slightly coarser grain size with a noticeable increase in shell material.
	1.9			Color change boundary. Gray-yellow structureless medium quartz sand.

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 22 bottom **Date of Coring:** 940819 **Logged by Keil Schmid** **Date Logged:** 941005

Location (FRF coordinates, m)
X (cross shore) = 230.0 **Y (long shore) =** 939.4 **Z=** -2.10 **(NGVD; top of core)**

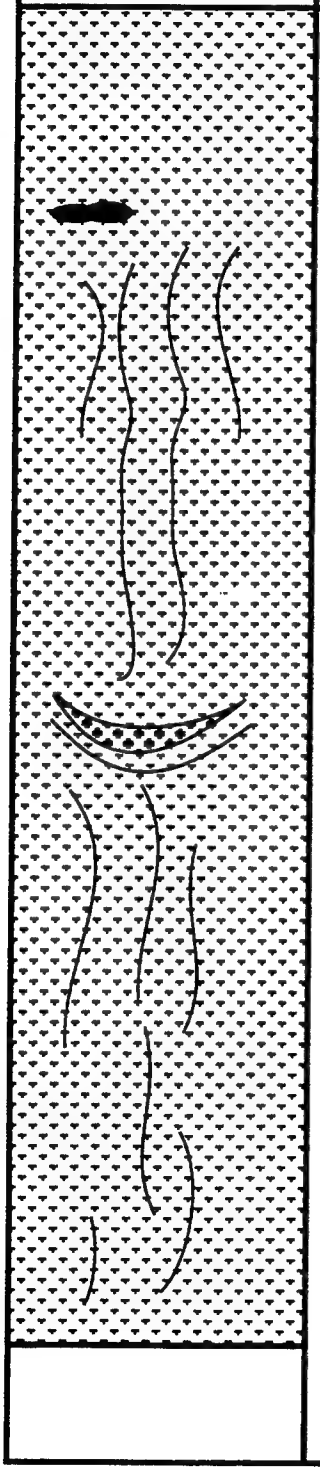


Lithology East — West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.9			Gray-yellow structureless fine to medium quartz sand.
				Same bed, but has nicely-preserved structures. Distinct grain size change (coarser) and color is yellow-brown. Laminae are alternately coarser and finer, and exhibit same color change as bulk of the sand.
			1.00	
	1.9			
	1.7	10-15 W		
		15 E		Change in bedding direction.
	1.5	15 E		
			1.25	Sharp erosional (?) contact dipping 15°E. Gray-yellow fine to medium quartz sand. Very fine, closely-spaced sub-horizontal laminations.
	1.9	3 W		
		2 W		Sharp contact dips 2°W. Yellow medium quartz sand, steeper bedding than overlying unit.
	1.7	20 E		
	1.2	0		
	1.7	0		Sharp contact, horizontal. Medium to coarse poorly sorted quartz sand with shell.
		15 W	**1.50**	
	1.5	10 E		Erosional contact. Yellow-gray poorly sorted medium-fine quartz sand weak bedding, fairly steeply dipping.
	1.0	7 E		
	1.0			Very weak contact dips 10°E. Yellow/brown medium-coarse quartz sand with crossbeds of coarse sand.
	1.5			

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 23 top **Date of Coring:** 940819 **Logged by Keil Schmid** **Date Logged:** 941005

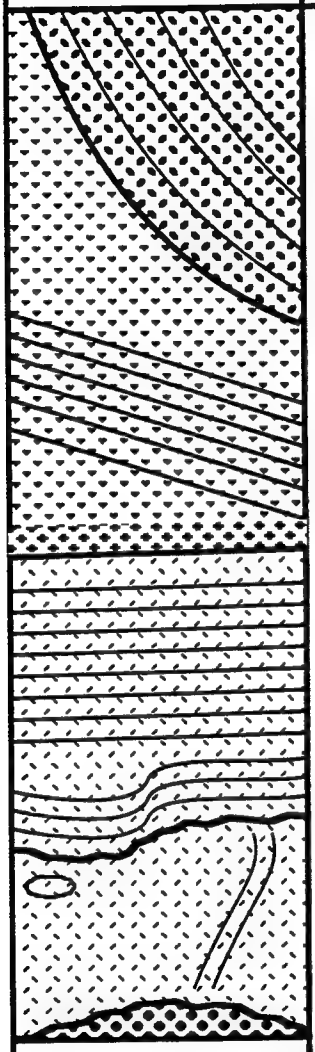
Location (FRF coordinates, m)
X (cross shore) = 209.8 **Y (long shore) =** 939.5 **Z=** -1.86 **(NGVD; top of core)**

Lithology East / West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	2.0		0.25	Grey-yellow fine to medium quartz sand. Vertical flow structures (due to water escape during coring?). Several large black shells are present.
			0.50	Slight indication of bedding that has been distorted.
			0.75	Graded contact.
	1.8			Very coarse sand to gravel, slightly bimodal. Section is fining upwards and no structures are present.

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 23 bottom **Date of Coring:** 940819 **Logged by Keil Schmid** **Date Logged:** 941005

Location (FRF coordinates, m)
X (cross shore) = 209.8 **Y (long shore) =** 939.5 **Z=** -1.86 **(NGVD; top of core)**

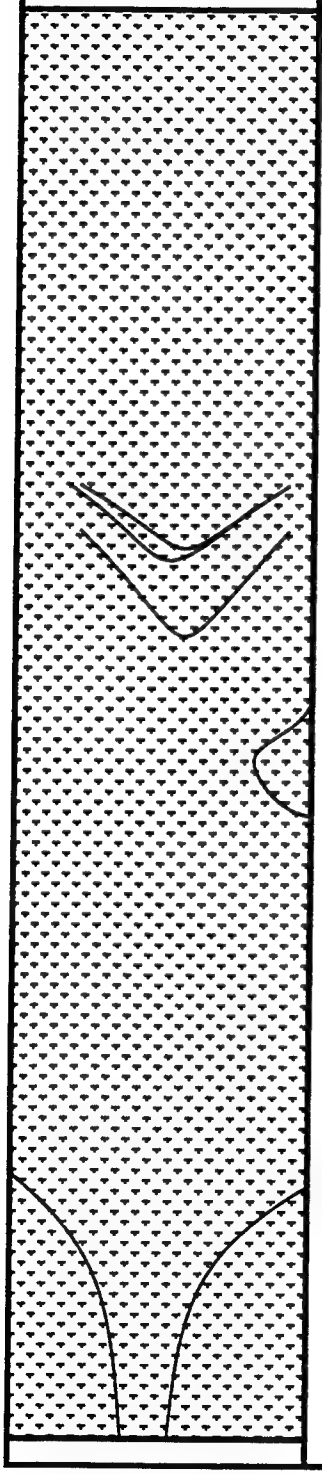


Lithology East / West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.8		1.00	Yellow-brown medium quartz sand. Almost vertical bedding. Nearly vertical border with gray medium-fine quartz sand. Continuation of fining-upward trend found at the bottom of top half of core.
	1.6			
	1.9			Nearly vertical contact. Gray medium/fine quartz sand fining upwards sequence. Below 1.25 m there are crossbeds that dip steeply to the west (30°). Bottom of unit is yellow-brown medium-coarse quartz sand.
		30 W	1.25	
	1.4	30 W		
	2.0	3 W		
		2 E		
		2 E		
	1.9			
	2.0	5 E	1.50	Contact looks erosional. Gray-black fine quartz sand. No bedding, possibly bioturbuted.
	1.6			
				Medium-coarse sand, curved contact.
			1.75	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 24 top **Date of Coring:** 940819 **Logged by Keil Schmid** **Date Logged:** 941013

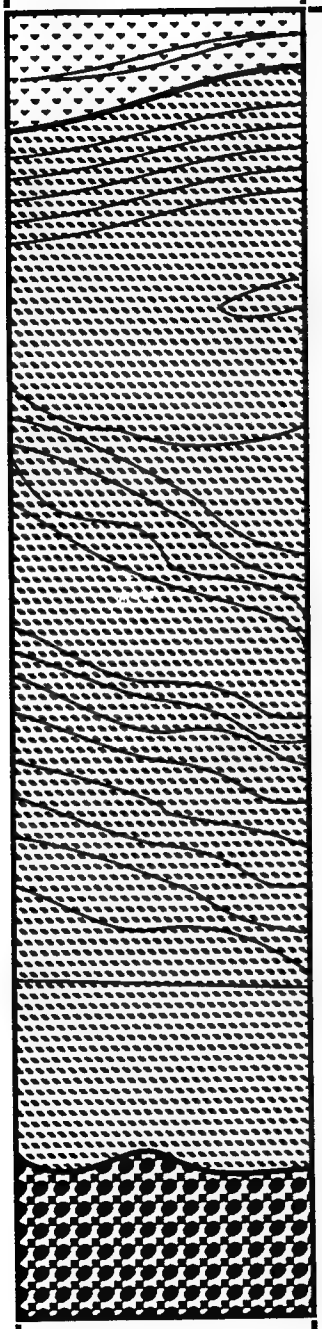
Location (FRF coordinates, m)
X (cross shore) = 168.8 **Y (long shore) =** 940.0 **Z=** -1.54 **(NGVD; top of core)**

Lithology East — West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
			0.25 0.50 0.75 1.00	Structureless gray-yellow fine-medium quartz sand. No grain size trends. Some pockets of slightly coarser sediment. Only slight mottling is noticeable. No notable features.

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 24 bottom **Date of Coring:** 940819 **Logged by Keil Schmid** **Date Logged:** 941013

Location (FRF coordinates, m)
X (cross shore) = 168.8 **Y (long shore) =** 940.0 **Z=** -1.54 **(NGVD; top of core)**

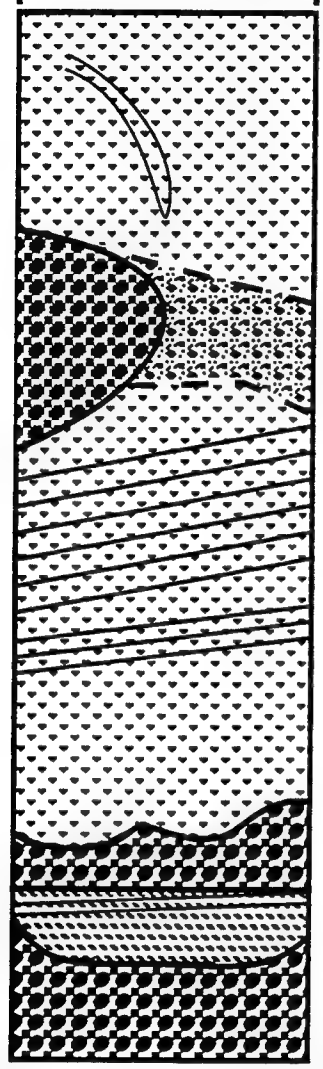


Lithology East / West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.8	20 E 20 E		Yellow-brown medium-fine quartz sand. Very slight laminae at 20°E, (very! slight)
		15 E		Sharp contact indicated by color change dips 20°E. Gray fine-medium quartz sand. Slightly-deformed (?) cross-bedding dips15°E.
	2.0		1.25	
		20 W		
		35 W		Wavy cross-bedding dipping to W. Cross beds have slightly coarser grain size.
			1.50	
		20 W		
	1.9			
		10 W 5 W		
			1.75	Same bed, but no signs of cross-bedding.
	2.0			Graded contact.
	1.0			Very coarse sand to gravel. Slightly bimodal. No structures. Fining upwards.
	0.0			

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 25 **Date of Coring:** 940819 **Logged by Keil Schmid** **Date Logged:** 941013

Location (FRF coordinates, m)
X (cross shore) = 145.4 **Y (long shore) =** 940.8 **Z=** -0.88 **(NGVD; top of core)**

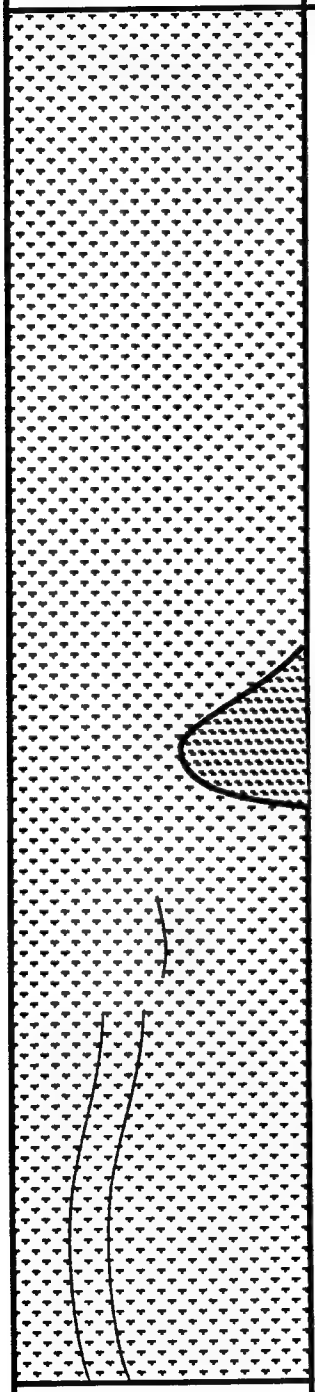


Lithology East / West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.9			Yellow-gray fine-medium quartz sand is structureless from top of core to 0.3 m. Possible bioturbation.
	1.0		0.5	Lens-like contact containing a pod of poorly sorted coarse quartz sand to gravel. Bimodal.
	2.0	20-30 E		Disturbed contact (due to coring?). Slightly curved. Sequence of yellow-brown medium-coarse fining upward to fine to medium quartz sand. Upper section (0.5 m to 0.75 m) has distinct dark heavy mineral laminations. Dip angles decrease downwards. Only weak indication of laminae below 0.75m.
	1.8	10 E		
			1.0	
	1.5			Noticeably coarser.
	-1.5			Contact is somewhat sharp and is horizontal. Yellow-brown sandy gravel to pebble. Bimodal.
	1.8	5		Very sharp contact dips 5°E. Gray-yellow medium-fine sand grading downward into medium-coarse sand. Slight structures in upper portion.
	1.5	5		
	0.8			
	-1.0		1.5	Graded sharp contact, looks slightly distorted. Yellow-brown very coarse sand to gravel. No structures. Slightly bimodal.
			2.0	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 26 top **Date of Coring:** 940819 **Logged by Keil Schmid** **Date Logged:** 941014

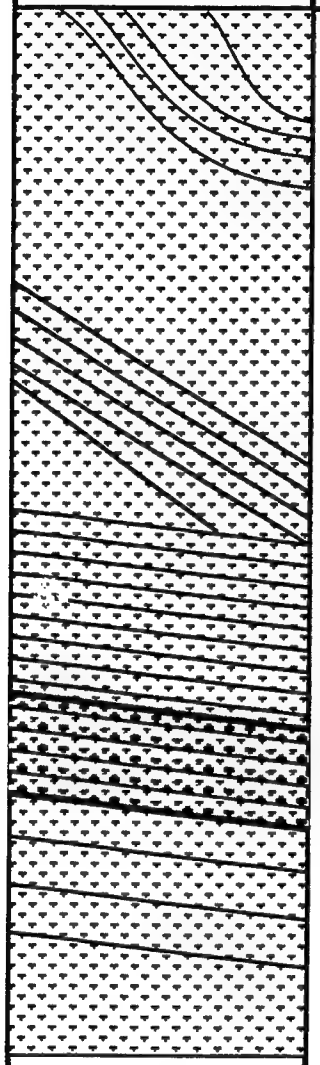
Location (FRF coordinates, m)
X (cross shore) = 169.3 **Y (long shore) =** 951.7 **Z=** -1.55 **(NGVD; top of core)**

Lithology East / West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.9		0.25	Yellow-gray fine-medium quartz sand. No visible cross-bedding in upper 0.95 m. Possibly a slight fining-upward sequence.
			0.50	
			0.75	Flow structures.
	1.8		1.00	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 26 bottom **Date of Coring:** 940819 **Logged by Keil Schmid** **Date Logged:** 941014

Location (FRF coordinates, m)
X (cross shore) = 169.3 **Y (long shore) =** 951.7 **Z=** -1.55 **(NGVD; top of core)**

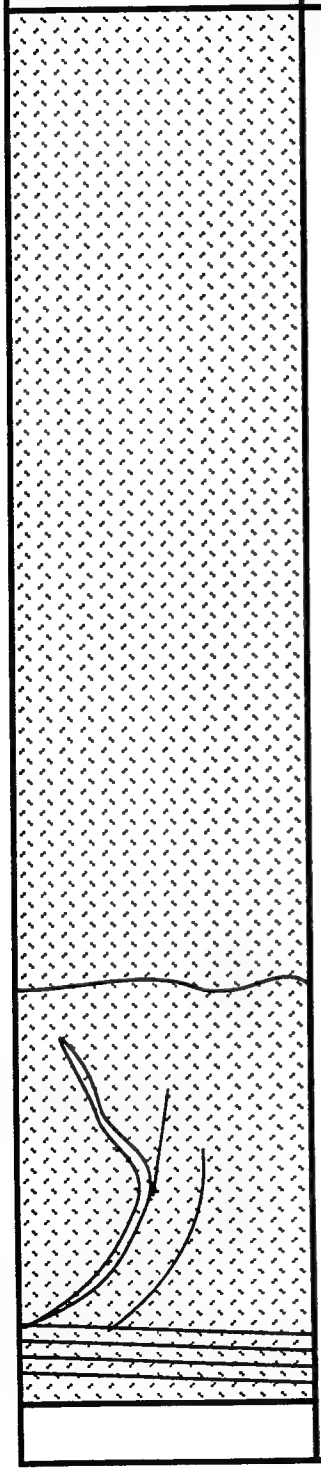


Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
1.8		1.00	Yellow-gray medium-fine quartz sand cross-beds in upper portion of bed may have been deformed during coring. Lower portion has increasingly coarser cross-beds.
	50 W		
		1.25	
1.6	40 W		
1.6	10 W		
	10 W		Graded contact dips 10°W
1.0	10 W	1.50	Same bed, but coarse sand sequence of cross-beds dipping 10°W.
	10 W		
1.9	10 W		Sharp contact dips10°W. Gray medium-fine sand. Very faint cross-beds dip 10°W. Cross-bedding is much less-well-defined than that in the overlying bed. Slight fining-upward sequence.
1.7			
		1.75	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 27 (top) **Date of Coring:** 940819 **Logged by Keil Schmid** **Date Logged:** 941014

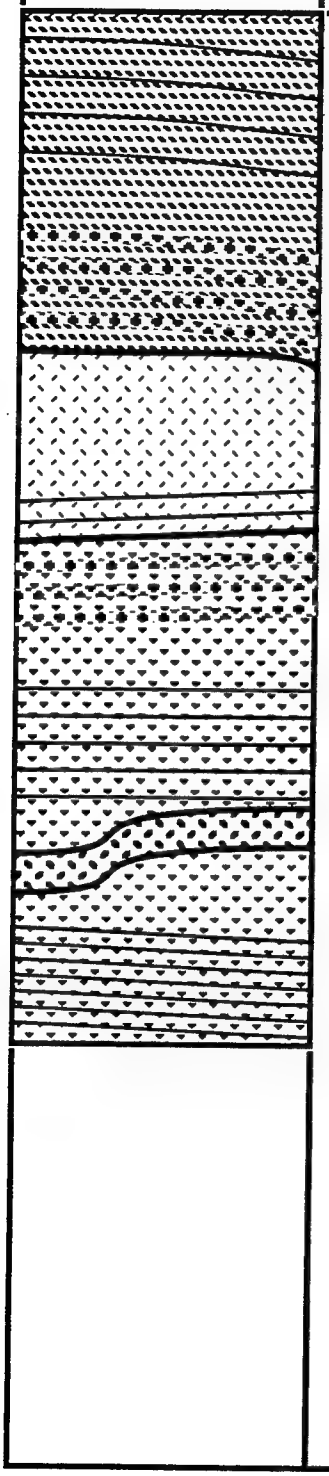
Location (FRF coordinates, m)
X (cross shore) = 205.8 **Y (long shore) =** 950.3 **Z=** -1.79 **(NGVD; top of core)**

Lithology East / West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.9		0.25	Typical yellow-gray medium-fine quratz sand. Very faint flow structures in upper portion of core. Only minor grain size variations.
	1.8	0	0.50	
			0.75	Beginning to see very faint evidence of cross-bedding at bottom of core. Above that there are flow structures.
	1.9	5 W	1.00	Color is more gray, it is wetter or slight difference in sediment grain size or comp.

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 27 (bot) **Date of Coring:** 940819 **Logged by Keil Schmid** **Date Logged:** 941014

Location (FRF coordinates, m)
X (cross shore) = 205.8 **Y (long shore) =** 950.3 **Z=** -1.79 **(NGVD; top of core)**

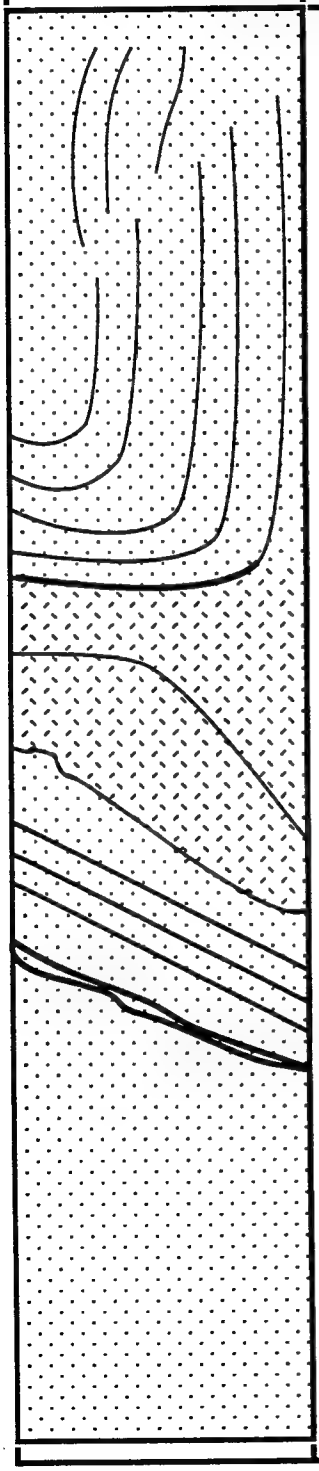


Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
1.9		1.00	Gray-yellow medium to medium fine quartz sand, fining upward.
	5 W		
1.7	10 W		Slightly curved cross-beds, dipping at 10°W.
1.9		1.25	Sharp, nearly horizontal contact. Gray fine quartrz sand with cross beds of medium sand. One very distinct organic layer. Several areas of iron staining, possibly of organic origin.
	5 E		
1.7			
1.9			Back to fine-medium quartz sand, very slight indication of cross-bedding.
	?	1.50	
1.5			Very strange contact (?) and very sharp medium quartz sand (yellow). Slight indications of cross-bedding.
1.9			Once again a strange contact, very sharp (erosional??). Gray fine-medium quartz sand. Very slight indications of cross-bedding possibly dipping 5°W. Bottom of core at 1.67 m.
	5 W		
		1.75	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 28 (top) **Date of Coring:** 940825 **Logged by Keil Schmid** **Date Logged:** 941015

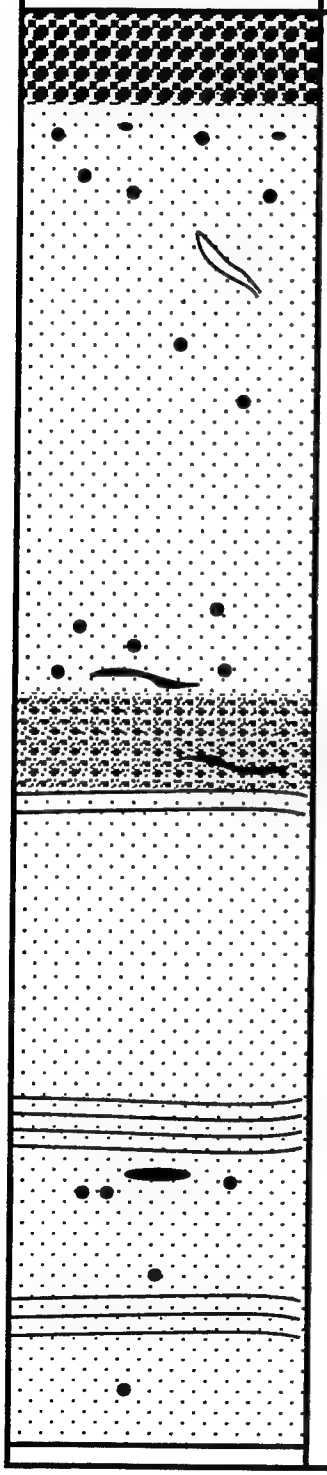
Location (FRF coordinates, m)
X (cross shore) = 599.0 **Y (long shore) =** 991.5 **Z=** -5.77 **(NGVD; top of core)**

Lithology East / West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	2.1		0.25	Gray-yellow fine quartz flow structures dominate the structures, heavily disturbed.
	2.0		0.50	Yellow-gray fine sand, nearly devoid of any structures.
	2.1	40 W	0.75	Several silty clasts
		38W		Silty cross-bed. Below cross-bed there are numerous silty patches and coarse sand to gravel particles. Silty particles appear to be rip-up clasts. Matrix sediment is gray fine quartz sand.
	1.9		1.00	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 28 (bot) **Date of Coring:** 940825 **Logged by Keil Schmid** **Date Logged:** 941015

Location (FRF coordinates, m)
X (cross shore) = 599.0 **Y (long shore) =** 991.5 **Z=** -5.77 **(NGVD; top of core)**

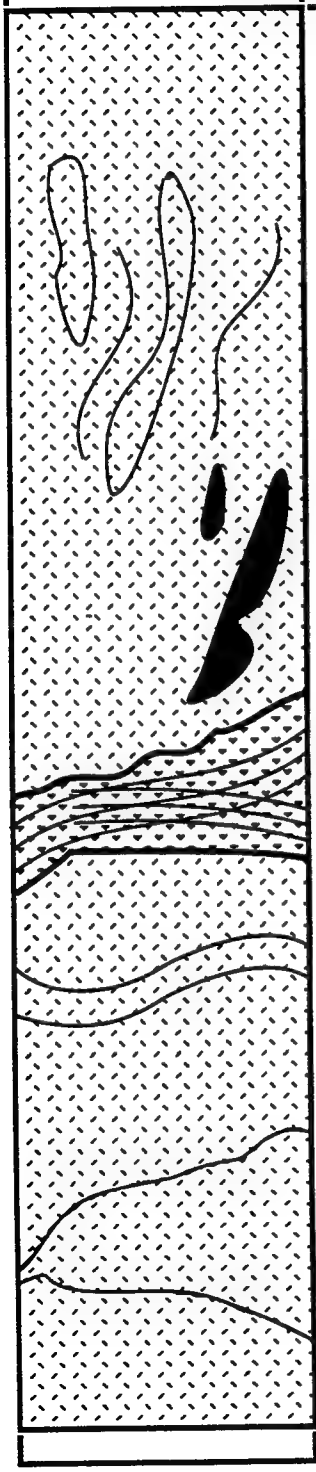


Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
1.5			Gray fine to very fine quartz sand with interbeds of coarse gravel to pebble-=sized grains. Cross-beds appear to be horizontal and their contacts are not sharp. Scattered "floating" gravel particles.
1.2			
2.0		1.25	Several bioturbation structures filled with yellow fine-medium quartz sand.
		1.50	
0.8	0?		Very faint horizontal laminations.
2.1		1.75	
	0?		Very faint horizontal laminations.
1.2			
2.0	0?		Very faint horizontal laminations.
		2.00	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 29 (top) **Date of Coring:** 940825 **Logged by Keil Schmid** **Date Logged:** 941014

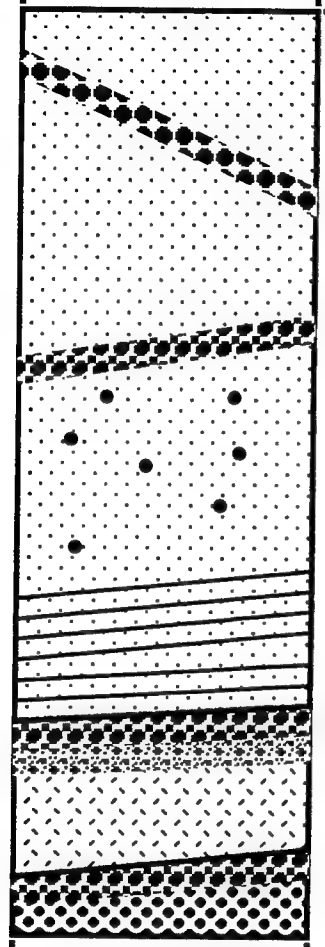
Location (FRF coordinates, m)
X (cross shore) = 498.9 **Y (long shore) =** 992.3 **Z=** -4.91 **(NGVD; top of core)**

Lithology East / West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	2.0		0.25	Gray fine quartz sand.
				Unusual mottling with some very black stained sand, organic.
		30 E	0.50	Contact, sharp, st 30°E. Yellow-gray fine-medium quartz sand with faint cross-bedding at 10°E.
	1.8			
		5 E		Contact marked by heavy mineral layer. Appears to be deformed, 5°E dip? Gray fine quartz sand. Trace amounts of coarse sand and gravel. No discernible bedding structures.
	2.0		0.75	
				Black sand bed
			1.00	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 29 (bot) **Date of Coring:** 940825 **Logged by Keil Schmid** **Date Logged:** 941014

Location (FRF coordinates, m)
X (cross shore) = 498.9 **Y (long shore) =** 992.3 **Z=** -4.91 **(NGVD; top of core)**

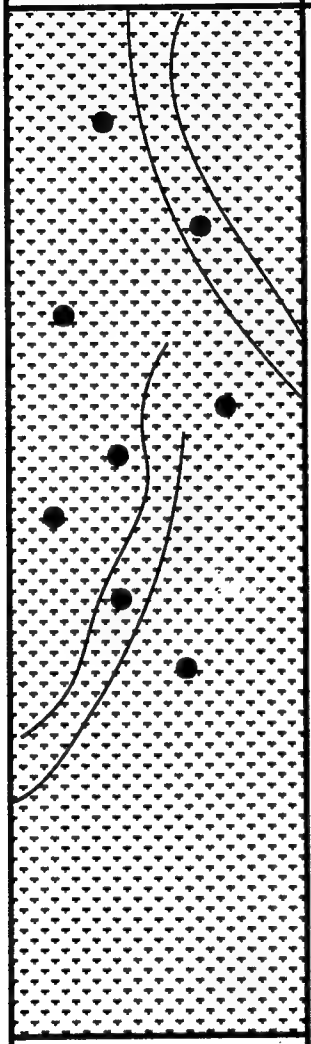


Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
2.2			Dark gray very fine quartz sand.
1.0	30 W		Very coarse/gravel steep cross-bed.
2.0			
0.5	20 E	1.25	Very coarse steep cross-bed.
1.9			Very fine sand with scattered gravel.
2.2	10 E		Heavy mineral cross-beds and mica? Very fine sand.
	5 E		
-1.0	5 E	1.50	Sandy gravel contact at 5°E . Coarsening-upward sequence.
2.0	10 E		Fine quartz sand.
0.0			
1.7			Coarse sand to gravel cross-bed, coarsening upward.
		1.75	
		2.00	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 30 (top) **Date of Coring:** 940825 **Logged by Keil Schmid** **Date Logged:** 941017

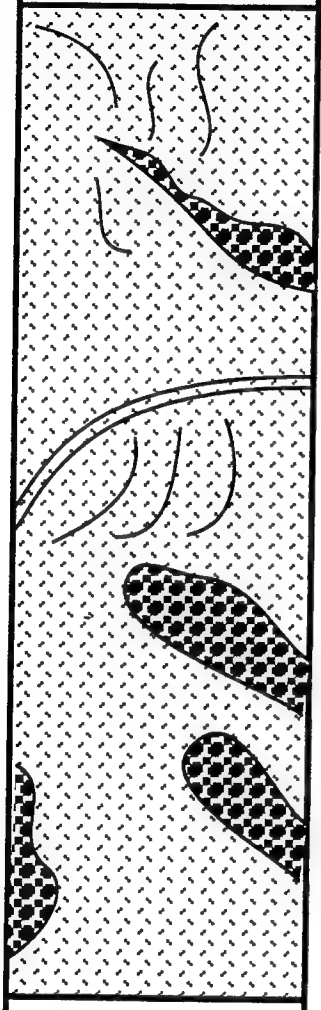
Location (FRF coordinates, m)
X (cross shore) = 400.0 **Y (long shore) =** 992.6 **Z=** -4.40 **(NGVD; top of core)**

Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	 1.9		0.25 0.50 0.75 1.00	Gray-yellow fine-medium quartz sand. No signs of cross-bedding. Flow-like structures are visible, but in general top 0.75 m of core is fairly homogenous. Numerous coarse sand to granule-sized grains scattered throughout the core.

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 30 (mid) **Date of Coring:** 940825 **Logged by Keil Schmid** **Date Logged:** 941017

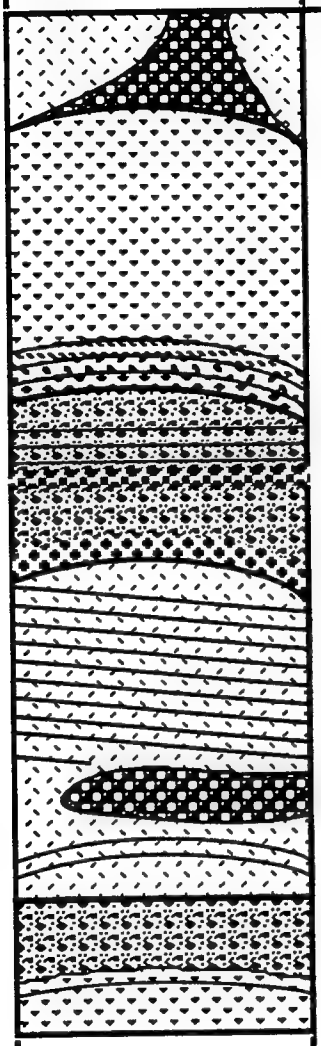
Location (FRF coordinates, m)
X (cross shore) = 400.0 **Y (long shore) =** 992.6 **Z=** -4.40 **(NGVD; top of core)**

Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	2.0			(Top of middle of #30) Gray fine quartz sand. No preserved structures, but evidence of structures destroyed by coring. Scattered coarse sand grains in matrix.
	1.0	20 W		
	2.0		1.00	
	1.7			Yellow-gray fine to medium quartz sand. Abundant coarse grains scattered throughout.
	2.0			Yellow-gray fine-medium quartz sand with distinct "pods" of coarse sand to gravel grains. These may have been cross-beds, before coring. Both dip at about 30°W. Fewer floating coarse grains.
	0.0	30 W	1.25	
	2.0			
	0.5	30 W		
	2.0		1.50	
			2.00	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 30 (bot) **Date of Coring:** 940825 **Logged by Keil Schmid** **Date Logged:** 941018

Location (FRF coordinates, m)
X (cross shore) = 400.0 **Y (long shore) =** 992.6 **Z=** -4.40 **(NGVD; top of core)**

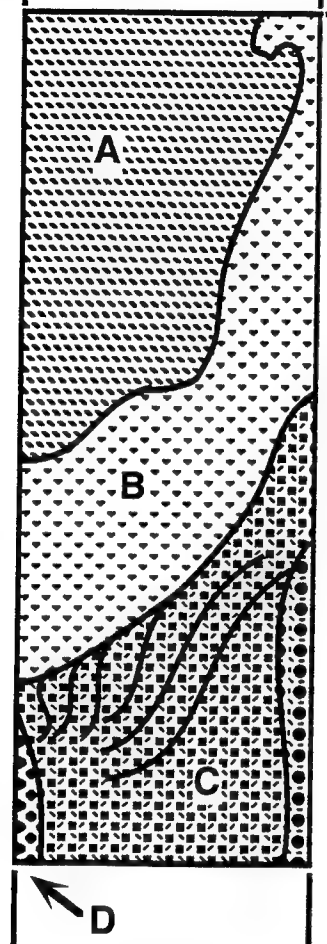


Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
			(Bottom of #30)
1.7			Gray fine quartz sand with coarse basal layer, probably the bottom of this fining-upwards sequence.
		1.50	
2.0			Sharp contact, disturbed by coring? Fining-upwards sequence. Gray fine-medium quartz sand at top, coarsening to yellow-brown coarse sand. Only the faintest indication fo cross-bedding in coarse part.
1.0	10 W		Very sharp contact, curved and dipping 15°W. Small fining-upwards sequence. Gray fine quartz sand coarsening downwards to coarse sand. Faint cross-bedding is noticeable. Some coarse grains in fine-grained matrix.
2.0	15 W		
1.5	0		
0.0	5 W	1.75	
1.5			Slightly sharp boundary at 5°W. Gray fine quartz sand with numerous coarse grains; strongly bimodal (mixing of layers?). Grades downward into medium-coarse yellow quartz sand (well-sorted).
1.2	3 W		
2.0			
	10 W		Very sharp contact (3°W). Gray fine quartz sand with faint indications of cross-beds at 10°W? A couple of floating coarse sand-size shell fragments.
0.5	0		
	0		
		2.00	
	0		Sharp contact at 0°. Thin plane bed of yellow-brown coarse quartz sand.
2.0	0		
1.3			Sharp contact at 0°. Same bed as above.
1.8	0		Sharp contact at 0°. Coarsening upwards sequence. Bimodal gray fine quarz sand with coarse sand. One horizontal black bed.

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 31 (top) **Date of Coring:** 940825 **Logged by Keil Schmid** **Date Logged:** 941019

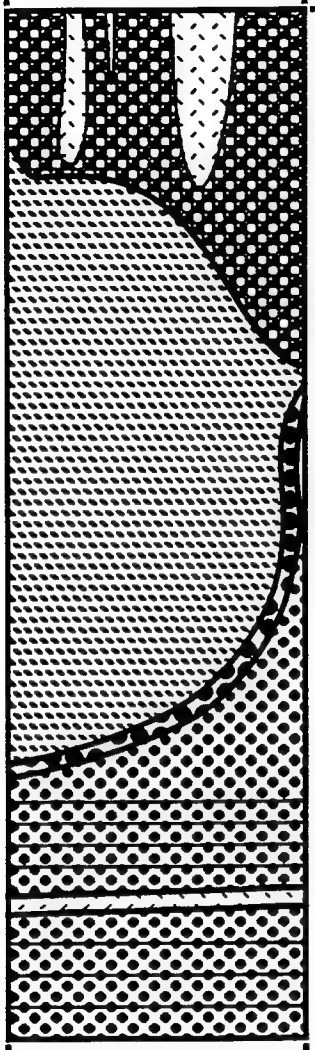
Location (FRF coordinates, m)
X (cross shore) = 346.7 **Y (long shore) =** 991.8 **Z=** -4.07 **(NGVD; top of core)**

Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
			0.25 0.50 0.75 1.00	Extremely disturbed core. Appears to have had significant structures A: Yellow medium-fine quartz sand with 5% shell material interspersed in matrix. B: Gray-yellow fine-medium quartz sand, without much shell material. C: Dark (black) fine to coarse heavy-mineral-enriched quartz sand. Very strange bed. Darkest material is at contact with B. Coarse grains on east wall of core tube. D: Yellow medium quartz sand with serveral gravel pieces. Poorly sorted. Bottom of core section at 0.60 m.

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 31 (bot) **Date of Coring:** 940825 **Logged by Keil Schmid** **Date Logged:** 941020

Location (FRF coordinates, m)
X (cross shore) = 346.7 **Y (long shore) =** 991.8 **Z=** -4.07 **(NGVD; top of core)**

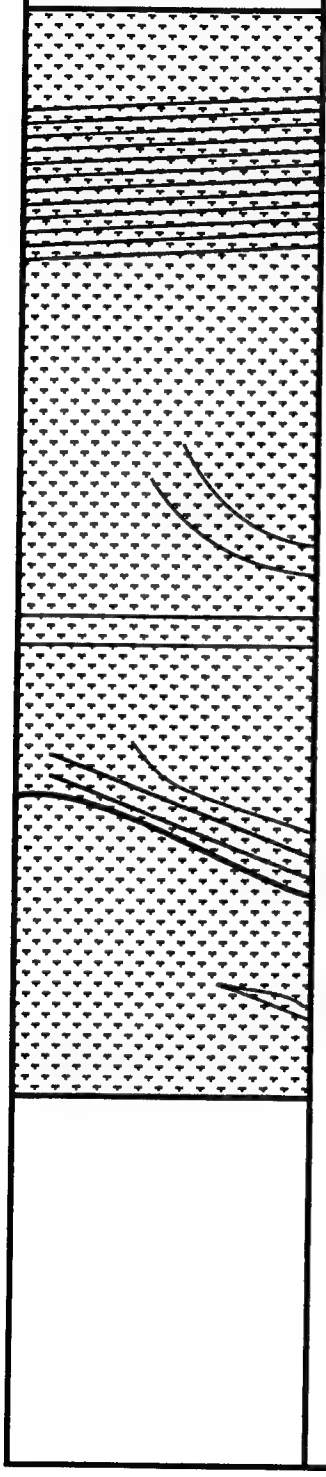


Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	Highly Variable			Highly disturbed? Vertical beds of alternating coarse and fine sand.
			0.75	Yellow-brown medium to very coarse sand.
	1.0			Irregular contact. Gray fine-medium quartz sand with scattered coarse to very coarse sand. Long bioturbation (?) structure, filled with coarse to very coarse sand.
	1.8			
			1.00	
	1.5			Relatively undeformed section of core. Yellow-brown medium-coarse sand grading to coarse-very coarse sand. Very faint indication of cross-beds with one easily recognized fine-grained lamination dipping 2°E. Fainter ones are horizontal.
		0		
	1.9	2 E	1.25	
	0.8	0		

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 32 (top) **Date of Coring:** 940908 **Logged by Keil Schmid** **Date Logged:** 941013

Location (FRF coordinates, m)
X (cross shore) = 270.2 **Y (long shore) =** 939.6 **Z=** -2.28 **(NGVD; top of core)**

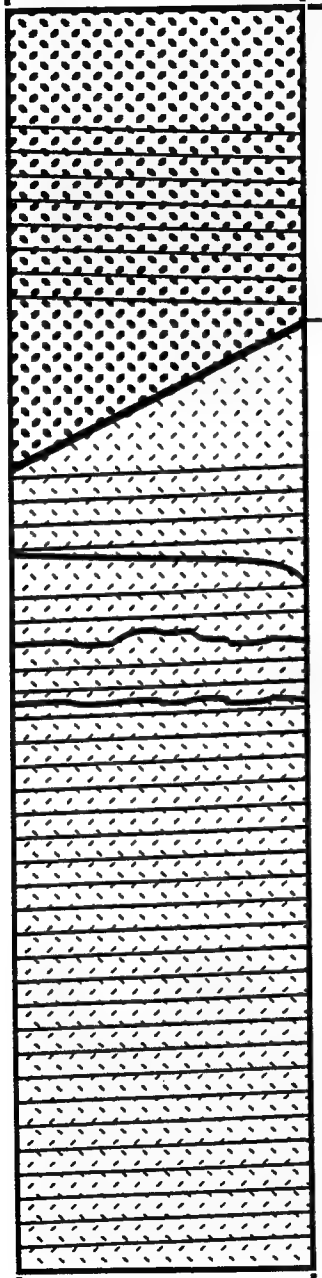


Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.9			Yellow-gray medium-fine quartz sand. Very slight indications of cross-bedding at 5°-7°E.
		5-7 E		Pockets of sltightly coarser sand mainly below 0.5m, otherwise very homogenous.
				Core has very slight laminations (may show up better with peel)
			0.25	
				Very slight laminations.
			0.50	
		30 W		Heavy mineral lamination.
		30 W		
	1.8	25 W		Slightly coarser sand.
			0.75	
			1.00	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 32 (bot) **Date of Coring:** 940908 **Logged by Keil Schmid** **Date Logged:** 941013

Location (FRF coordinates, m)
X (cross shore) = 270.2 **Y (long shore) =** 939.6 **Z=** -2.28 **(NGVD; top of core)**

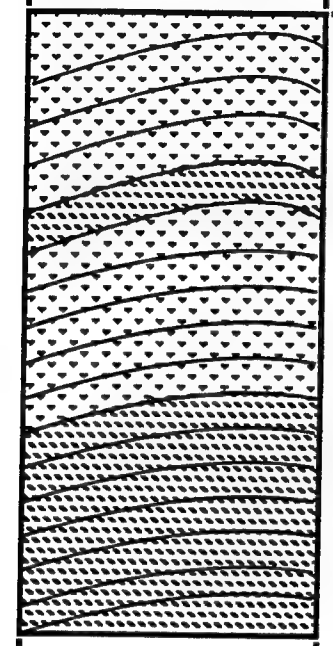


Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.8	5 W		Yellow-gray medium-fine quartz sand. Very faint cross beds dipping 5° W
		5 W		
		35 E	1.00	Sharp contact dipping 35°E
				Gray fine quartz sand. This bed is entirely cross-bedded with heavy mineral banding. All dips are nearly horizontal. No vertical change in grain size.
				Noticeably darker lamination.
				Cross-bed of olive/brown fine sand.
			1.25	
	2.0	≈2 E		
			1.50	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 33 (top) **Date of Coring:** 940908 **Logged by Keil Schmid** **Date Logged:** 941019

Location (FRF coordinates, m)
X (cross shore) = 260.2 **Y (long shore) =** 940.3 **Z=** -1.92 **(NGVD; top of core)**

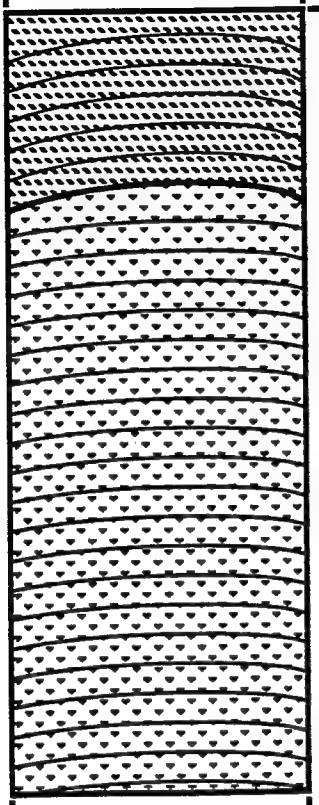


Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.7			Yellow medium-fine quartz sand. Very faint indication of cross beds in upper 10cm.
	2.0	20 E		Yellow-gray cross-beded medium-fine quartz sand. Top cross-bed is thick (5cm) and gray.
	1.8	10 E	0.25	
	1.9			Slight grain size change and slightly steeper cross beds. Slight fining-upwards trend.
	1.8	10-15E	0.50	
			0.75	
			1.00	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 33 (bot) **Date of Coring:** 940908 **Logged by Keil Schmid** **Date Logged:** 941020

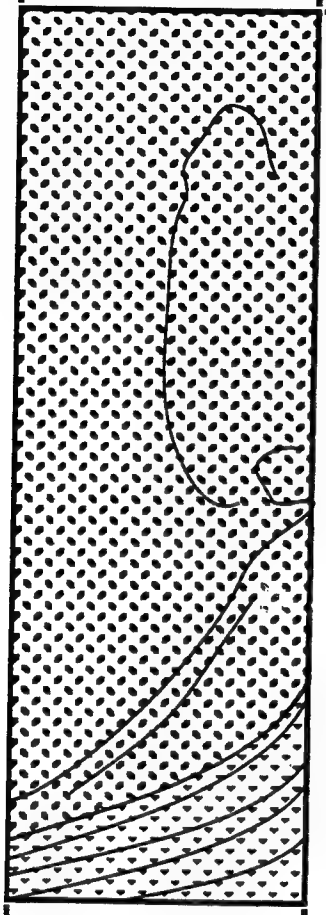
Location (FRF coordinates, m)
X (cross shore) = 260.2 **Y (long shore) =** 940.3 **Z=** -1.92 **(NGVD; top of core)**

Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.8	5-10 E	0.50	Yellow medium-fine quartz sand. Shallow dipping cross-beds at approximately 5°. Beds are curved, probably from coring. No major grain size differentiation between cross-beds.
	1.9	0-5 E	0.75	Subtle color and grain size change. Gray fine-medium quartz sand. Also cross-bedded, but slight apparent grain-size difference. Cross-beds are very shallowly dipping offshore, not more that 5°. Cross-beds are curved, but become flat at bottom of core.
			1.00	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 34 (top) **Date of Coring:** 940908 **Logged by Keil Schmid** **Date Logged:** 941020

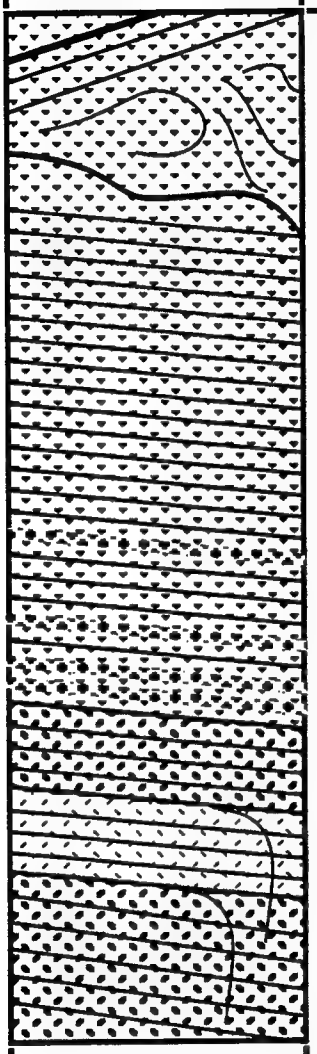
Location (FRF coordinates, m)
X (cross shore) = 250.1 **Y (long shore) =** 940.6 **Z=** -1.8 **(NGVD; top of core)**

Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.7		0.25	Yellow medium quartz sand. Flow structures down to about 50 cm from top of core. Slight fining-downwards trend is noticeable.
	1.9	50 E 40 E 30 E	0.50	Grey-yellow fine-medium quartz sand with partly preserved structures. Cross-beds appear to be slightly coarser or have more heavy minerals. Dip of beds is very steep at 50 cm from top of core, but dips flatten out quickly with down-core distance from 50 to 60 cm from the top of the core.
			0.75	
			1.00	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 34 (bot) **Date of Coring:** 940908 **Logged by Keil Schmid** **Date Logged:** 941020

Location (FRF coordinates, m)
X (cross shore) = 250.1 **Y (long shore) =** 940.6 **Z=** -1.80 **(NGVD; top of core)**

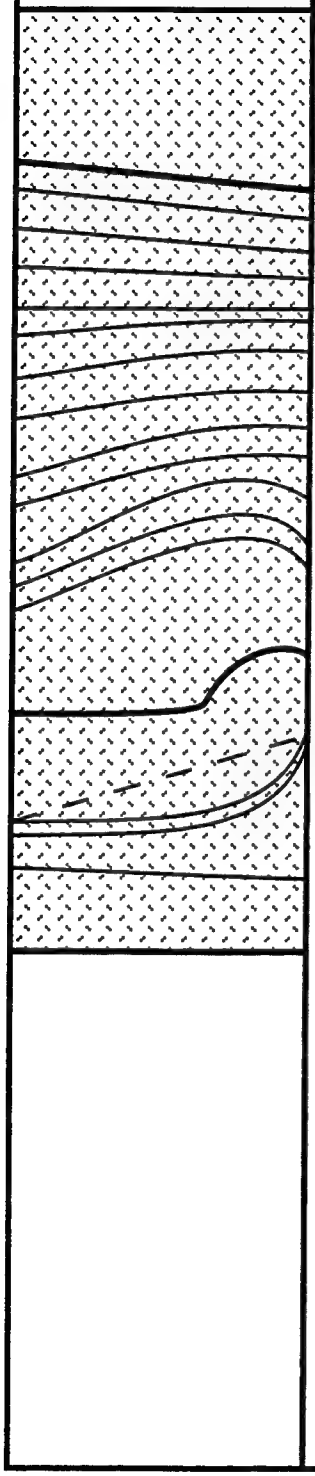


Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	20 E		Gray-yellow fine-medium quartz sand gradding into yellow-gray medium-fine quartz sand. Cross-bedding in upper portion at 20°E
1.9			
		0.75	
			Contact possibly erosional. Gray fine-medium quartz sand with faint cross-beds dipping approximately 10°W. Slight fining-upward trend.
	10 W		
1.9			
		1.00	Medium-coarse shelly quartz cross-bed.
1.7	10 -15 W		
			Sharp contact dipping 10°W.
	10 W		Yellow medium quartz sand crossbed.
1.5	10 W		
	10 W		
			Sharp contact (slightly disturbed) Black-gray fine quartz sand.
1.9	10 W		
	10 W	**1.25**	
			Sharp contact (also disrupted.) Yellow medium quartz sand with cross-beds dipping 20°W.
1.5	20 W		

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 35 (top) **Date of Coring:** 940908 **Logged by Keil Schmid** **Date Logged:** 941021

Location (FRF coordinates, m)
X (cross shore) = 239.9 **Y (long shore) =** 940.5 **Z=** -1.95 **(NGVD; top of core)**

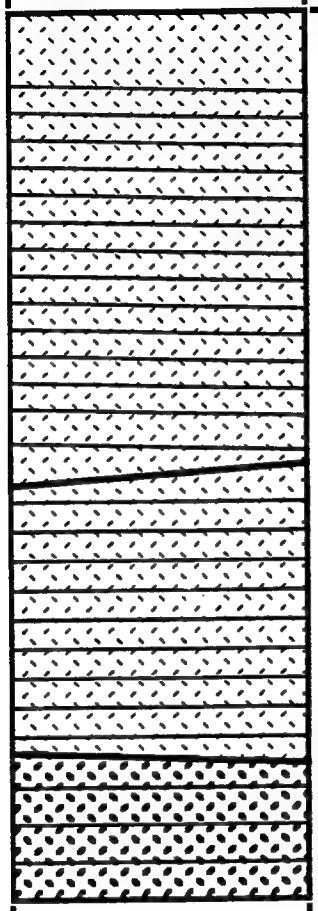


Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	2.0			Gray-yellow fine-medium quartz sand. No structures.
	1.9	10 W 5 W 0	0.25	Yellow medium-fine quartz sand fining downward to yellow gray fine-medium quartz sand crossbeds to 40 cm below top of core. Beds dip toward the west at 10 to 20 cm from top of core, and at greater depth dip sharply to east. Lower beds may have been disturbed by coring.
		15 E 20 E		
		35 E		
	1.8			
	1.9		0.50	Contact, possibly erosional. Slight color change to grayish-yellow fine-medium quartz sand. Two very distinct crossbeds that have been disturbed. Below disturbed cross beds sediment is gray fine-medium quartz sand with one distinctly undisturbed cross-bed at 5°W.
		20 E		
		5 W		
	2.0		0.75	
			1.00	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 35 (bot) **Date of Coring:** 940908 **Logged by Keil Schmid** **Date Logged:** 941021

Location (FRF coordinates, m)
X (cross shore) = 239.9 **Y (long shore) =** 940.5 **Z=** -1.95 **(NGVD; top of core)**



Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	2.0			Gray-yellow fine quartz sand coarsening to yellow gray fine-medium quartz sand. Cross-bedding structures throughout. They are faint but appear to be dipping onshore.
			0.75	
		2 - 5 W		
				Fairly sharp contact evident as a color change, 10°E dip.
	1.8			
	2.0	10 E	1.00	Gray fine quartz sand with horizontal cross-beds, once again very faint indications.
		0		
	2.0			
	1.6	2 W		Nearly horizontal sharp contact yellow medium quartz sand with some shell material. Possible horizontal cross-beds? Very faint!!
			1.25	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 36 (top) **Date of Coring:** 940908 **Logged by Keil Schmid** **Date Logged:** 941018

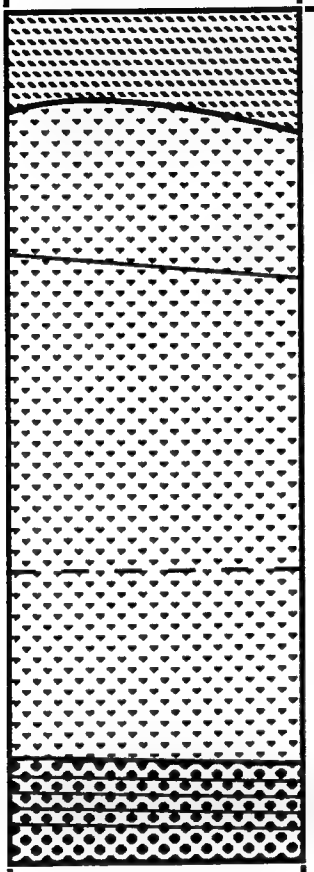
Location (FRF coordinates, m)
X (cross shore) = 230.4 **Y (long shore) =** 940.5 **Z=** -2.05 **(NGVD; top of core)**

Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.9			Yellow medium-fine quartz sand. Occasional flow structures. Very homogeneous, no sign of cross beds.
			0.25	
				Slightly coarser flow structure.
			0.50	
				One distinct cross-bed, deformed by coring (?).
		0	0.75	
	1.8			
			1.00	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 36 (bot) **Date of Coring:** 940908 **Logged by Keil Schmid** **Date Logged:** 941018

Location (FRF coordinates, m)
X (cross shore) = 230.4 **Y (long shore) =** 940.5 **Z=** -2.05 **(NGVD; top of core)**

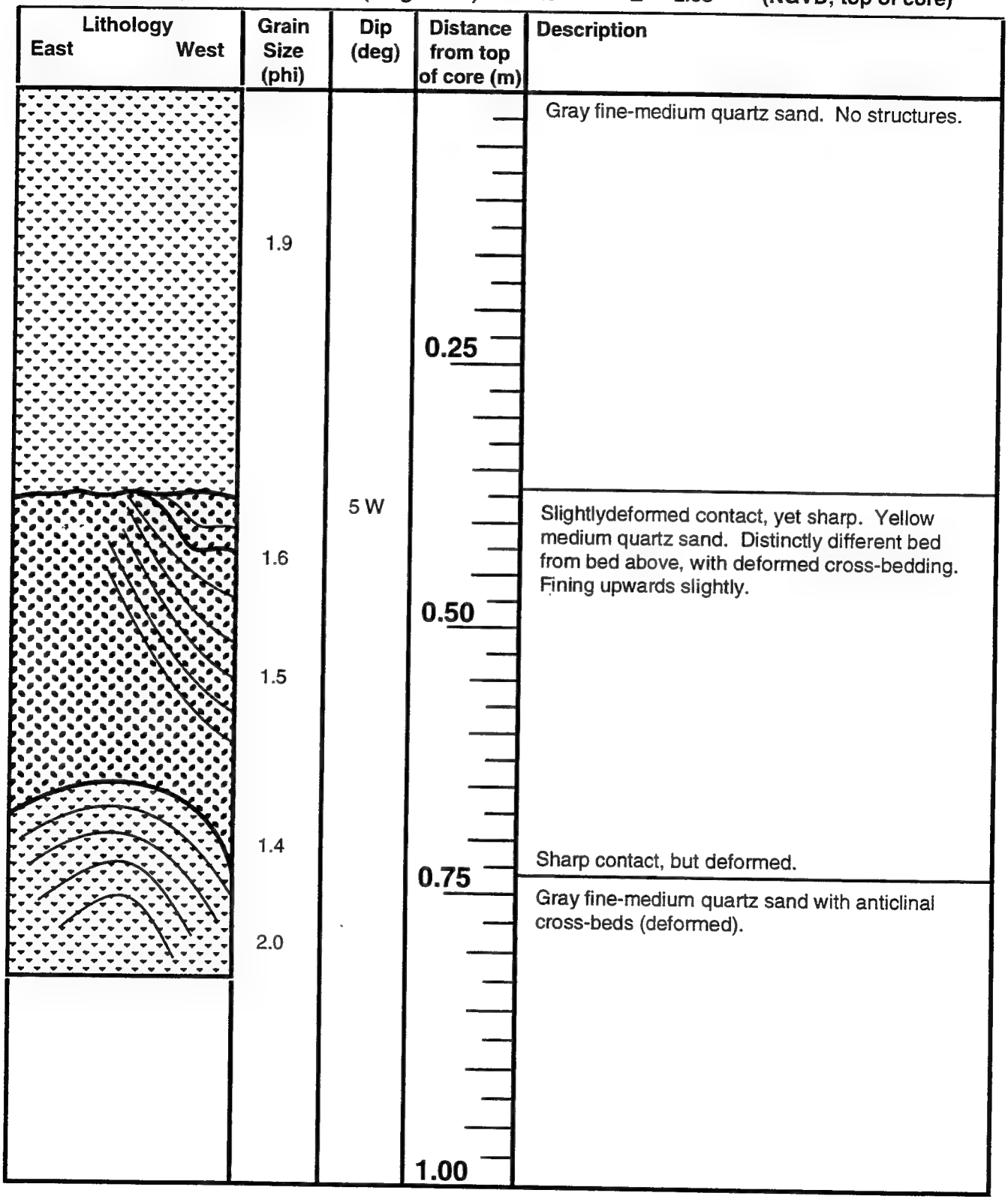


Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
				Yellow medium-fine quartz sand, no structures.
	1.8			
	2.0	7 W	1.00	Sharp contact, curved slightly, dipping 7°W. Gray fine-medium quartz sand. Fining-upwards unit. Faint cross-beds. Color changes to yellow down core.
		7 W		
			1.25	
		2 W		
	1.4	2 - 5 W	1.50	Medium-coarse quartz sand with abundant shell fragments. Very faint cross-bedding.

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 37 (top) **Date of Coring:** 940908 **Logged by Keil Schmid** **Date Logged:** 941022

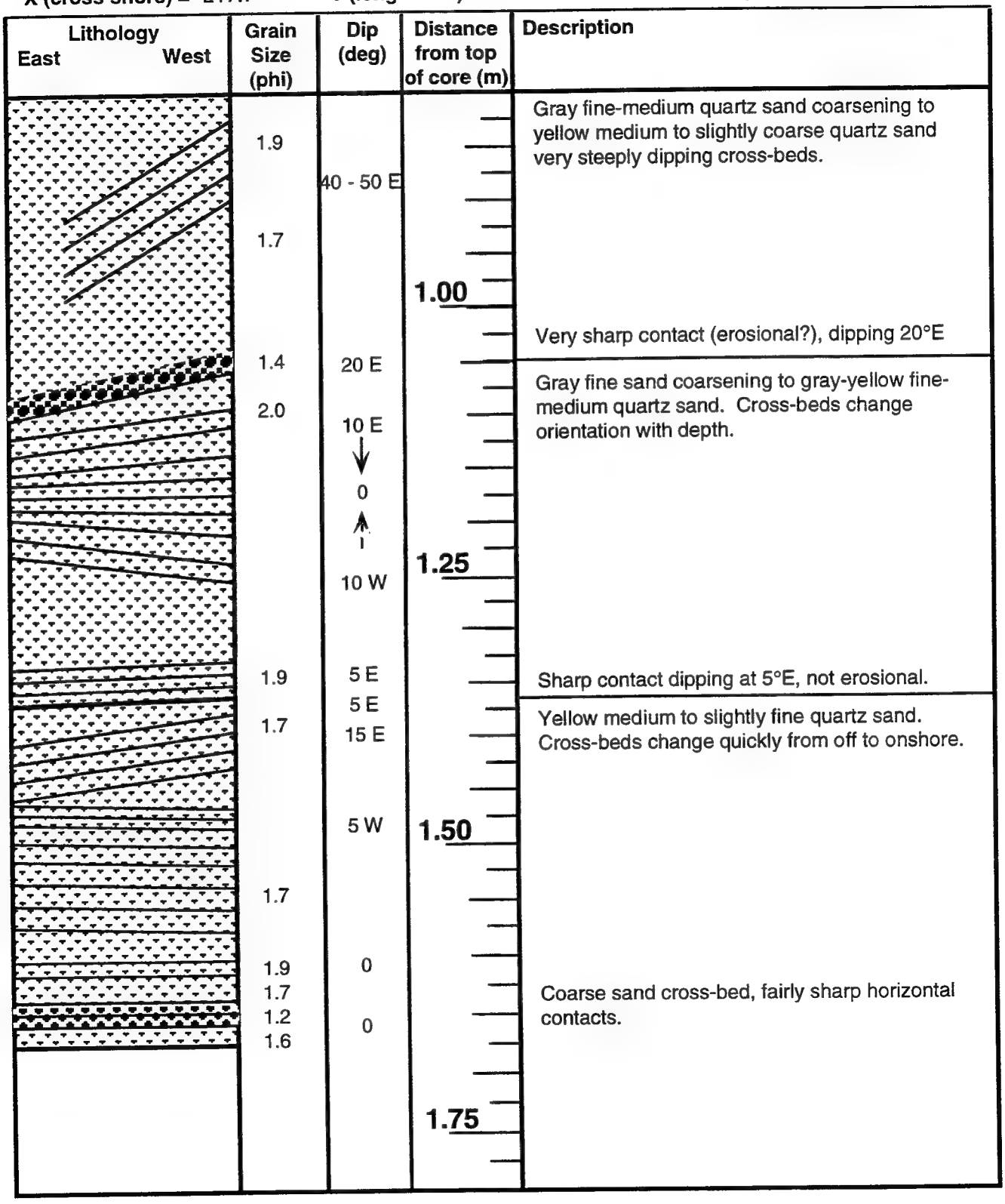
Location (FRF coordinates, m)
X (cross shore) = 217.7 **Y (long shore) =** 940.3 **Z=** -2.05 **(NGVD; top of core)**



Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 37 (bot) **Date of Coring:** 940908 **Logged by Keil Schmid** **Date Logged:** 941024

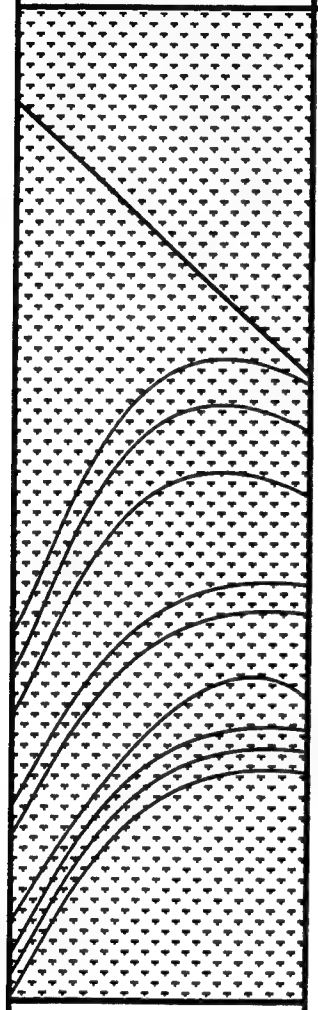
Location (FRF coordinates, m)
X (cross shore) = 217.7 **Y (long shore) =** 940.3 **Z=** -2.05 **(NGVD; top of core)**



Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 38 (top) **Date of Coring:** 940909 **Logged by Keil Schmid** **Date Logged:** 941024

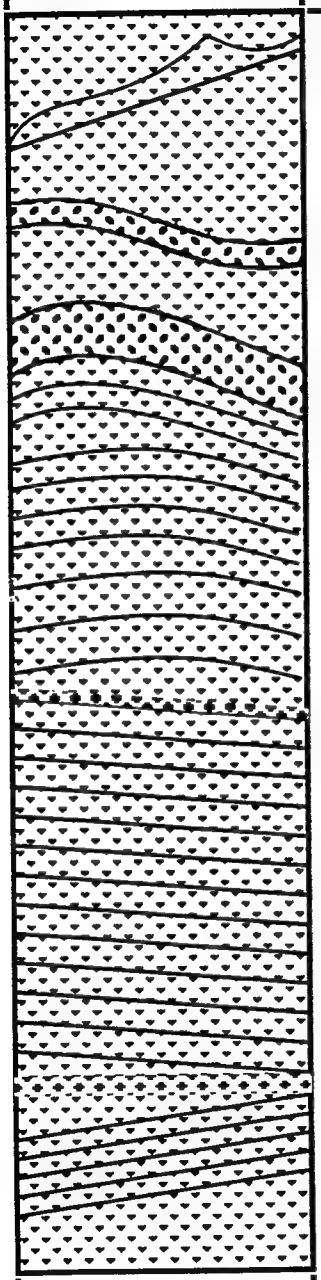
Location (FRF coordinates, m)
X (cross shore) = 210.3 **Y (long shore) =** 940.5 **Z=** -2.06 **(NGVD; top of core)**

Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.9	60 W 75 E	0.25	Gray fine-medium quartz sand, coarsening to yellow medium quartz sand at 30 cm below top of core. Marginal contact (disturbed)
		75 E	0.50	Yellow medium quartz sand. Cross-beds below 30cm are highly deformed and dip at extreme angles (up to 75°).
	1.5		0.75	
			1.00	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 38 (bot) **Date of Coring:** 940909 **Logged by Keil Schmid** **Date Logged:** 941031

Location (FRF coordinates, m)
X (cross shore) = 210.3 **Y (long shore) =** 940.5 **Z=** -2.06 **(NGVD; top of core)**

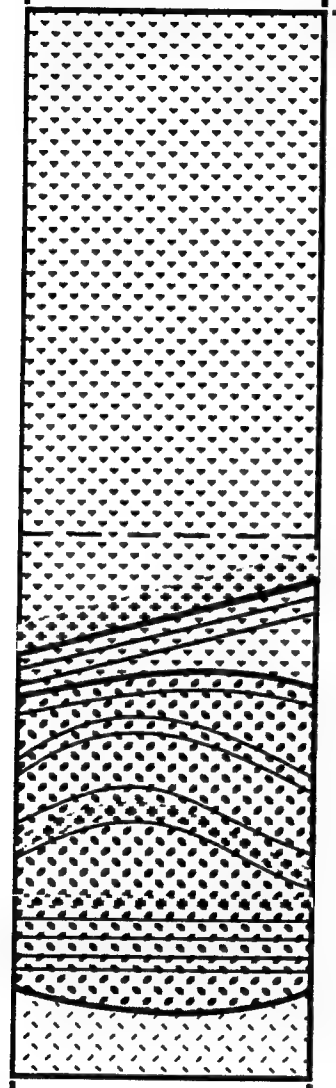


Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.7			Yellow-gray medium/fine to fine/medium quartz sand. Top cross beds deformed.
	1.9	30 E	0.75	
	1.2	20 W		
	1.2	30 W	1.00	
		20 W		
	1.8	15 W		
		10 W		
	1.5	10 W		
			1.25	
		10 W		
	1.8	5 W		
				Very subtle contact.
	1.4	15 E	1.50	
	1.6			

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 39 **Date of Coring:** 940909 **Logged by Keil Schmid** **Date Logged:** 941031

Location (FRF coordinates, m)
X (cross shore) = 205.1 **Y (long shore) =** 940.4 **Z=** -2.07 **(NGVD; top of core)**

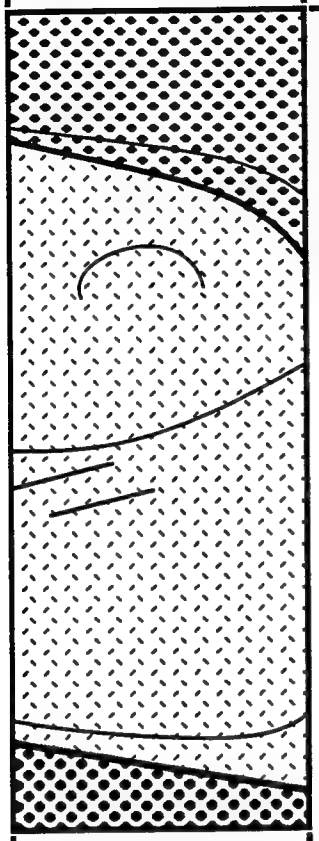


Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
			0.00	Yellow medium fine quartz sand. No apparent structures.
	1.7		0.50	
	1.5	40 W		Sharp contact dipping 35° - 40° W.
	1.9	5 W	1.00	
	1.4	10 W		Yellow medium quartz sand with coarse cross-beds that are highly deformed.
	1.5	0		
	1.6	0		Fairly sharp contact.
	2.0		1.50	Gray fine quartz sand. No apparent cross-beds.
			2.00	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 40 **Date of Coring:** 940909 **Logged by Keil Schmid** **Date Logged:** 941101

Location (FRF coordinates, m)
X (cross shore) = 170.4 **Y (long shore) =** 939.5 **Z=** -2.11 **NGVD; top of core)**

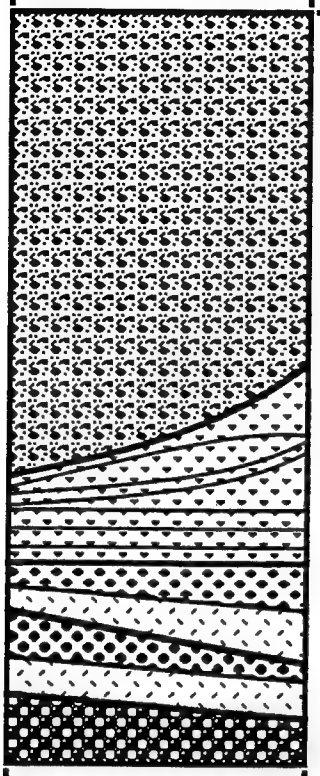


Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.6			Yellow medium quartz sand. Only faint indications of cross-bedding.
		20 W		
		40 W		
	1.8		0.50	Gray-yellow fine-medium quartz sand. Appears to be cross-bedded but beds are highly disturbed. Slight coarsening upwards sequence.
		0	1.00	
	1.9			
	1.3	30 W		Medium-coarse quartz sand.
			1.50	
			2.00	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 42 **Date of Coring:** 940909 **Logged by Keil Schmid** **Date Logged:** 941101

Location (FRF coordinates, m)
X (cross shore) = 146.2 **Y (long shore) =** 940.2 **Z=** -1.13 **(NGVD; top of core)**

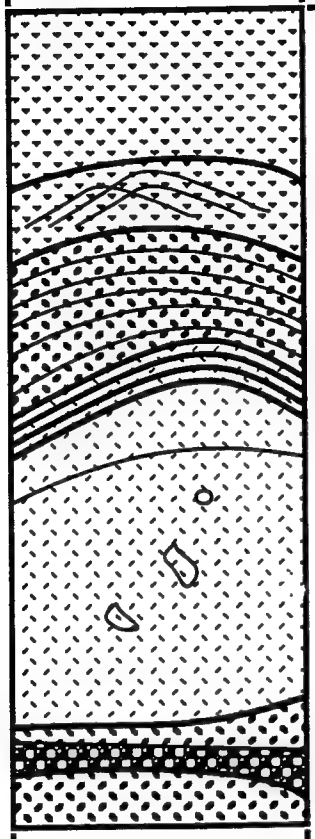


Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.7		0.5	Yellow-gray medium-fine quartz sand with coarse sand to gravel scattered in matrix. No apparent cross-beds preserved. Slight contact.
	1.9	50 E 20 E		Gray-yellow fine-medium quartz sand cross-bedded with upper portion slightly disturbed.
	1.3 1.7 1.0 1.7 0.0	0 15 W 20 W 15 W 15 W	1.0 1.5 2.0	Large cross-beds, alternating coarse and fine. All dipping onshore (W) at 15°-20°.

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 43 **Date of Coring:** 940909 **Logged by Keil Schmid** **Date Logged:** 941101

Location (FRF coordinates, m)
X (cross shore) = 219.9 **Y (long shore) =** 960.7 **Z=** -2.08 **(NGVD; top of core)**

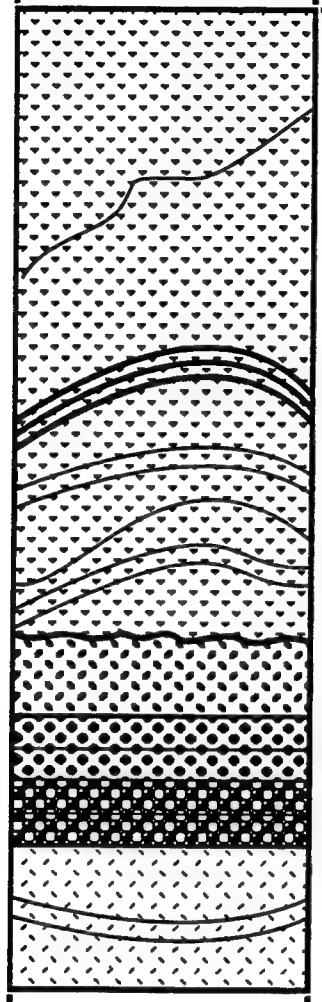


Lithology East / West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.7			Yellow-gray medium-fine quartz sand. No structures evident.
		0		
	1.9			Gray-yellow fine-medium quarz sand, with deformed structures.
		0		
	1.5		0.50	Gray fine quartz sand, cross-beds in upper portion, lower portion appears to be bioturbuted. No visible cross-beds in lower portion.
		30 E		
	2.0			
				Fairly sharp contact.
	1.7	15 E	1.00	Medium to very coarse sand with cross beds.
		15 W		
	1.0			
	1.6	15 W		Yellow medium quartz sand appears structureless.
			1.50	
			2.00	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 45 **Date of Coring:** 940909 **Logged by Keil Schmid** **Date Logged:** 941101

Location (FRF coordinates, m)
X (cross shore) = 270.2 **Y (long shore) =** 960.2 **Z=** -2.21 **(NGVD; top of core)**

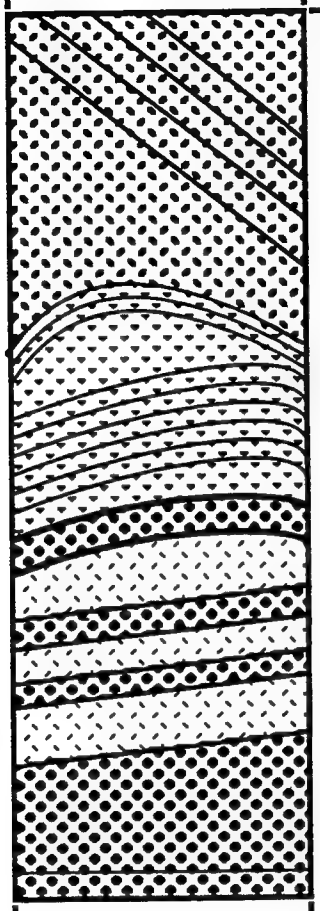


Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.7			Yellow-gray medium-fine quartz sand. Deformed structures.
			0.50	Graded contact.
	1.9	20 E		Gray--yellow fine-medium quartz sand, with disturbed structures.
	1.9			
	1.6	0	1.00	Very sharp erosional contact, horizontal. Fining-upward sequence. Top: yellow medium quartz sand. Bottom: yellow-brown coarse quartz sand appears to have cross-beds.
	1.2			
	0.8	0		Horizontal.
		0		
	2.2	0		Very sharp contact. Gray fine quartz sand with black and cross-beds.
			1.50	
			2.00	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 46 **Date of Coring:** 940909 **Logged by Keil Schmid** **Date Logged:** 941101

Location (FRF coordinates, m)
X (cross shore) = 260.1 **Y (long shore) =** 960.3 **Z=** -1.94 **(NGVD; top of core)**

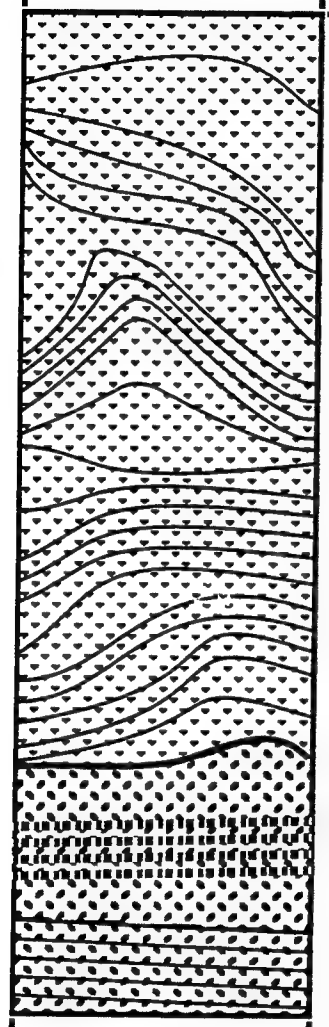


Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
1.6			Yellow medium quartz sand Cross beds dip steeply onshore. Probably disrupted?
	45 W		
1.6		0.50	
1.9	35 E		Yellow-gray medium-fine cross-bedded quartz sand. All cross beds dip offshore (East).
	20 E		
	15 E		
1.5			Gray fine quartz sand with cross beds of medium/coarse sand. Cross-bed sets up to 5 cm thick, dipping mainly offshore and fining-upward.
2.0			
1.4			
2.0	5 E		
1.2			
1.9	5 E	1.00	
1.0			
1.9	0		

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 47 **Date of Coring:** 940909 **Logged by Keil Schmid** **Date Logged:** 941101

Location (FRF coordinates, m)
X (cross shore) = 239.8 **Y (long shore) =** 960.1 **Z=** -1.97 **(NGVD; top of core)**

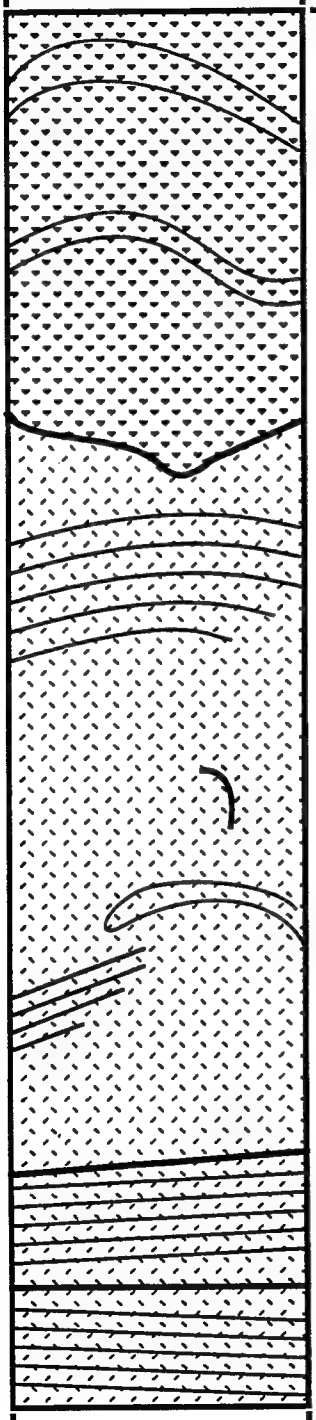


Lithology East — West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.9		0.00	Yellow-gray fine-medium fining upward to gray fine quartz sand. Many distorted cross-beds.
	1.7	45 W		
			0.50	
	1.8	15 W		
		40 W		
	2.0	30 E	1.00	
	1.5	5 E		Yellow-brown medium to very coarse cross-bedded sand. Cross-beds are coarser.
	1.0	10 W		
	1.5	10 W		Yellow-brown medium quartz cross-bedded sand. Cross-beds are slightly coarser.
			1.50	
			2.00	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 48 **Date of Coring:** 940909 **Logged by Keil Schmid** **Date Logged:** 941005

Location (FRF coordinates, m)
X (cross shore) = 230.3 **Y (long shore) =** 960.0 **Z=** -2.07 **(NGVD; top of core)**

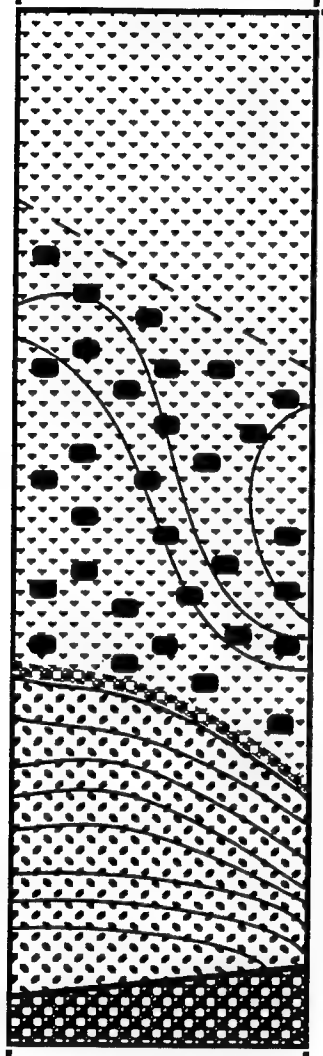


Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.9			Yellow-gray fine-medium quartz sand. Several distorted bedding structures.
			0.25	
	1.8			
	2.0			Gray fine quartz sand. Graded contact, slight color change. Crude bedding with iron staining (?). Grain size homogeneous from top of core to 0.8 m from top of core.
		10 E		
			0.50	
		15 E		Very weak indications of bedding.
			0.75	
		10 E		Color change, slightly darker.
		5 E		
	2.0			
		0		
	1.8			
		5 E		
			1.00	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 49 **Date of Coring:** 940909 **Logged by Keil Schmid** **Date Logged:** 941101

Location (FRF coordinates, m)
X (cross shore) = 152.9 **Y (long shore) =** 960.9 **Z=** -1.51 **(NGVD; top of core)**

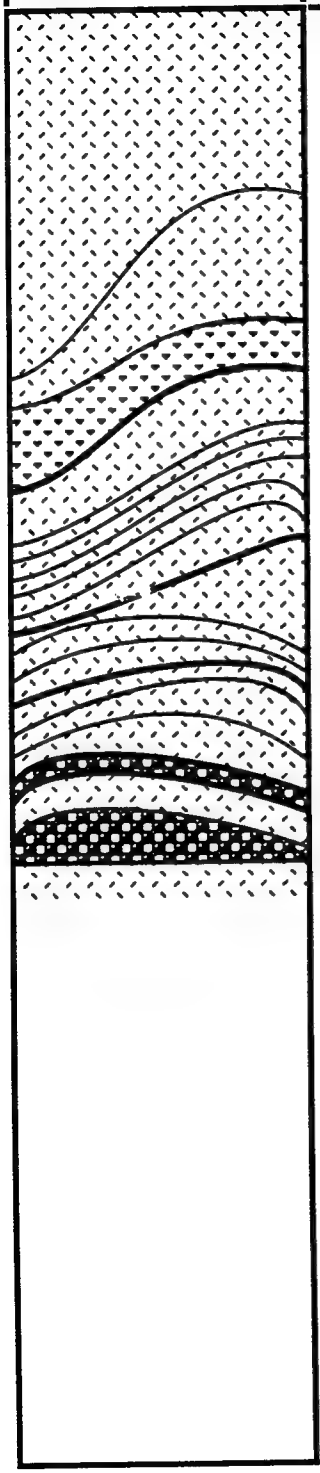


Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.8		0.25	Yellow-gray fine-medium quartz sand. No structures.
	1.5		0.50	Yellow-gray fine-medium quartz sand with numerous gravel "floaters." Poorly sorted, bimodal.
	1.9	20 W		Gray-yellow medium quartz sand. Cross-beds are deformed on the west wall of core pipe.
				Sharp contact (15°E)
	0.8	15 E	0.75	Sandy gravel, no cross-bedding evident. Bimodal.
			1.00	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 50 **Date of Coring:** 941021 **Logged by Keil Schmid** **Date Logged:** 941027

Location (FRF coordinates, m)
X (cross shore) = 370.0 **Y (long shore) =** 940.3 **Z=** -3.65 **(NGVD; top of core)**

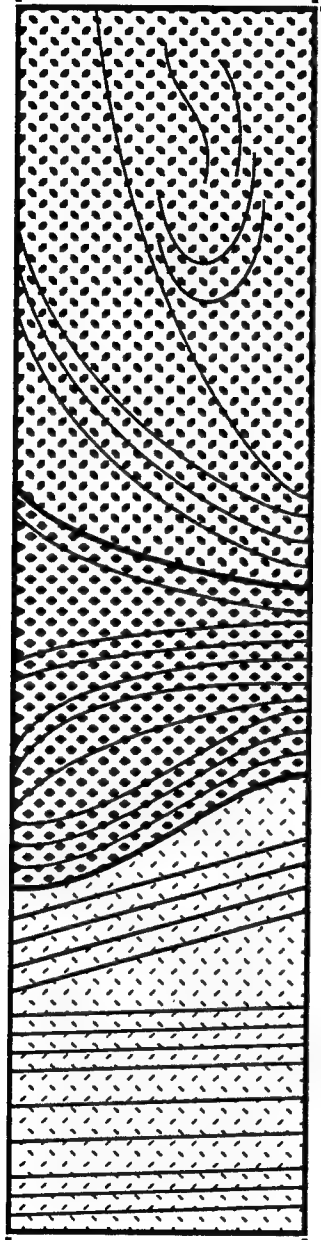


Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	2.0	50 E	0.50	Yellow-gray fine-medium quartz sand appears to have had some structure, especially below 0.5 m but highly deformed. Fining-upward sequence.
	1.5			Erosional contact: sharp color change and slight grain size change. Yellow gray fine-medium quartz sand fining to gray-black fine quartz sand. Lots of cross-beds dipping offshore but somewhat disturbed. Closely spaced.
	1.9	25 E		
	2.3	25 E 25 E		
	2.0	5 W	1.00	Color change contact with only slight grain size change. Dips 25°E. Gray fine quartz sand finning to gray-black fine quartz sand. Cross-beds switch from onshore (at top) to offshore.
	2.1	15 E 5 E		
	2.0			Curved contact? 5°E (deformed) Gray fine quartz sand with curved nearly horizontal bleck color cross-beds at top. Two prominant coarse sand cross-beds.
	0.5	15 W	1.50	
	0.5	15 W		
	2.0	0	2.00	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 51 **Date of Coring:** 941021 **Logged by Keil Schmid** **Date Logged:** 941027

Location (FRF coordinates, m)
X (cross shore) = 340.4 **Y (long shore) =** 939.6 **Z=** -2.98 **(NGVD; top of core)**

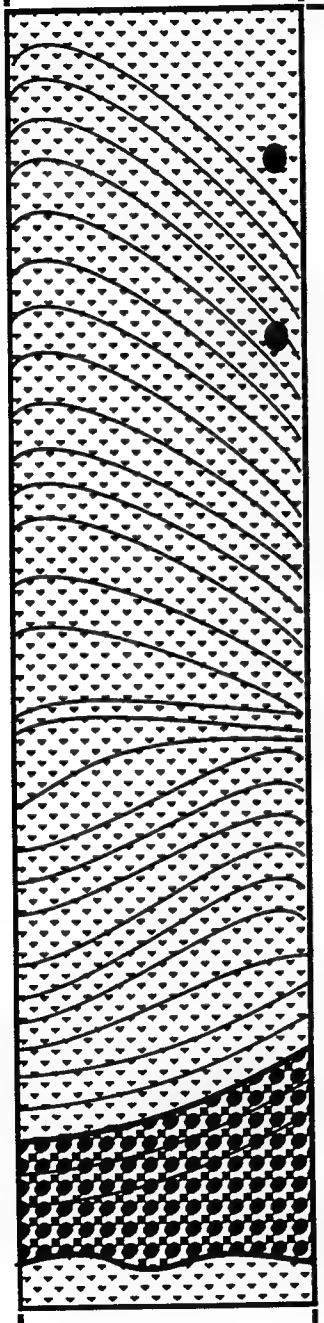


Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
			Yellow-gray medium quartz sand coarsening upwards. No major grain size variations.
		0.50	
1.8			Highly deformed by coring.
			Slightly coarser cross-beds
1.6	40 E	1.00	Possible deformation during coring?
			Fine quartz sand cross-beds dipping steeply offshore (E).
1.9	30E		
	5E		
		1.50	Fine quartz sand cross-beds dipping shallowly offshore (E).
1.6			
2.0			
		2.00	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 52 **Date of Coring:** 941021 **Logged by Keil Schmid** **Date Logged:** 941030

Location (FRF coordinates, m)
X (cross shore) = 167.0 **Y (long shore) =** 939.8 **Z=** -1.64 **(NGVD; top of core)**

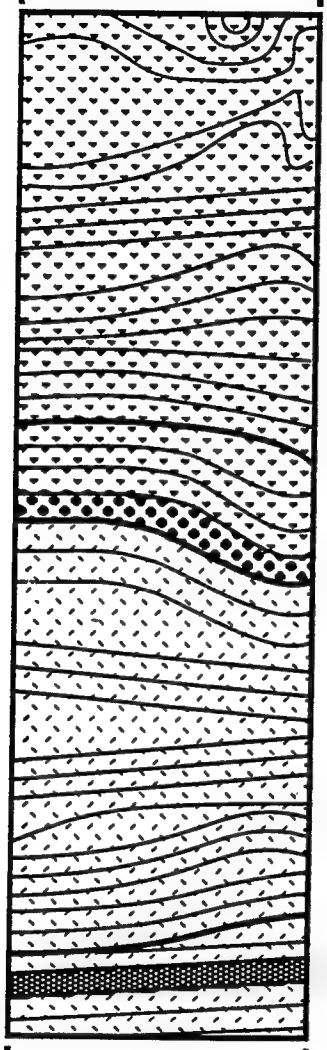


Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.8			Yellow-gray fine-medium quartz sand slight finning upwards. Highly cross-bedded but all beds disturbed during coring.
		70 W		Two pebble-size quartz fragments.
			0.25	
		50 W		
		35 W		
			0.50	
		0		Sudden change in cross bed dip direction with no apparent erosional surface.
		30 W		
		50 W		
	1.7	30 W		
		30 W		Very sharp contact.
		30 W	0.75	
	1.2			Yellow-brown medium to very coarse quartz sand, not any shells. Slight cross-bedding.
	0.0			Very sharp irregular contact.
	1.9			Gray-yellow fine-medium quartz sand.
			1.00	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 53 **Date of Coring:** 941021 **Logged by Keil Schmid** **Date Logged:** 941030

Location (FRF coordinates, m)
X (cross shore) = 320.0 **Y (long shore) =** 939.3 **Z=** -2.83 **(NGVD; top of core)**

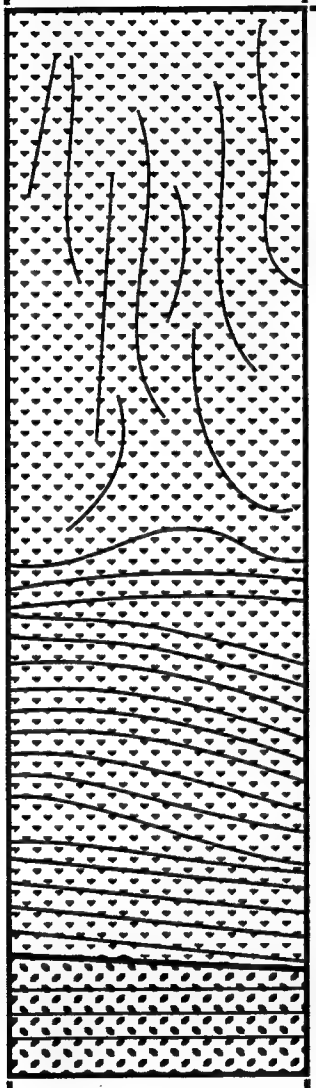


Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
2.0			Yellow medium-fine quartz sand has slight flow structures in top 10 cm or core. Disturbed cross-beds below 10 cm.
	10 E		
	5 W	0.50	
			Fairly sharp contact, dipping 30°W, disturbed by coring.
1.7	30 W		
1.8	35-40 W		Yellow-gray fining-upward sequence. High angle cross-beds, disturbed by coring. Sharp contact dipping 35°W, disturbed.
1.5	35 W		
2.0	15-20 W		Gray fine quartz sand. Fining-upward sequence. Cross beds throughout. Coarse-grained cross beds from 100 cm to 125 cm below top of core.
	5 W	1.00	
	10 E		
1.5			
	25 E		
2.0	20 E		Very subtle contact.
	5 E		Gray fine quartz sand with single black cross-bed. Cross-beds are very subtle and dip shallowly off-shore.
2.0	10 E		
	5E	1.50	
		2.00	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 55 **Date of Coring:** 941023 **Logged by Keil Schmid** **Date Logged:** 941030

Location (FRF coordinates, m)
X (cross shore) = 330.0 **Y (long shore) =** 939.9 **Z=** -2.42 **(NGVD; top of core)**

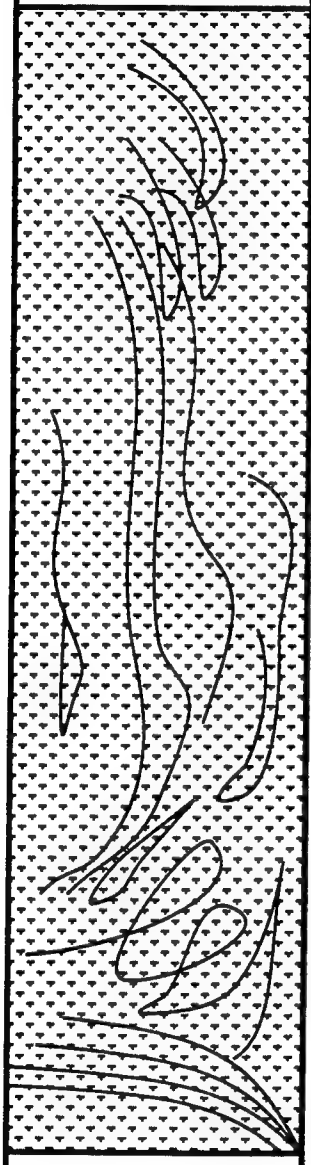


Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
1.6	Flow	0.50	Yellow-gray medium to slightly fine quartz sand. Flow structures caused by coring extend from top of core to 75 cm below top of core.
1.7	10 E		Abundant cross beds dipping 10°E, possibly deformed by coring.
	35 W	1.00	Beds possible deformed by coring?
	35 W		
1.6	15 W		Beds likely undeformed.
1.9	10 W		
2.0	0		Sharp contact dipping 10°W
1.7		1.50	Gray fine quartz sand coarsening downward to gray-yellow fine-medium quartz sand. Horizontal cross beds (?) and some gravel-size grains.
		2.0	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 56 **Date of Coring:** 941023 **Logged by Keil Schmid** **Date Logged:** 941031

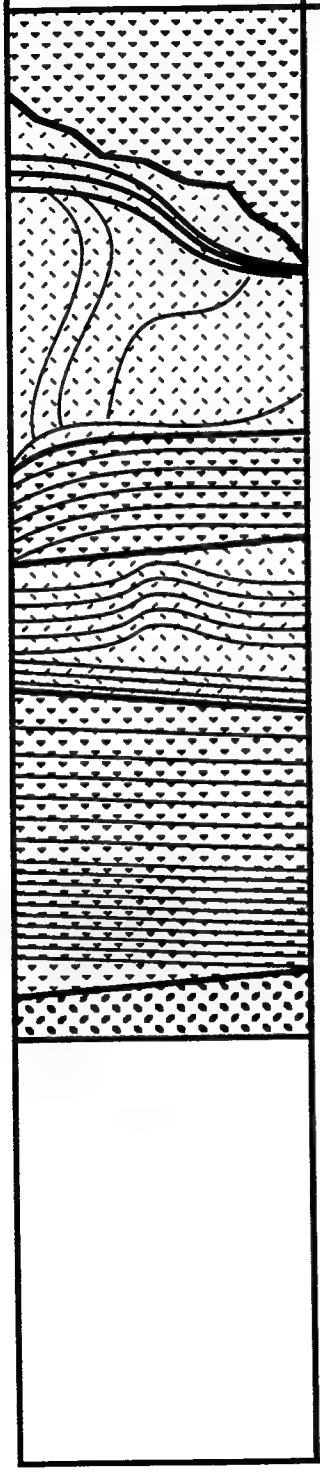
Location (FRF coordinates, m)
X (cross shore) = 309.8 **Y (long shore) =** 939.6 **Z=** -2.72 **(NGVD; top of core)**

Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	 1.8		0.25 0.50 0.75 1.00	Entire core markedly disturbed by coring. Yellow/gray fine-medium quartz sand. Homogeneous grain size. Possible westward-dipping cross beds.

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 57 **Date of Coring:** 941023 **Logged by Keil Schmid** **Date Logged:** 941027

Location (FRF coordinates, m)
X (cross shore) = 360.2 **Y (long shore) =** 1006.0 **Z=** -3.16 **(NGVD; top of core)**

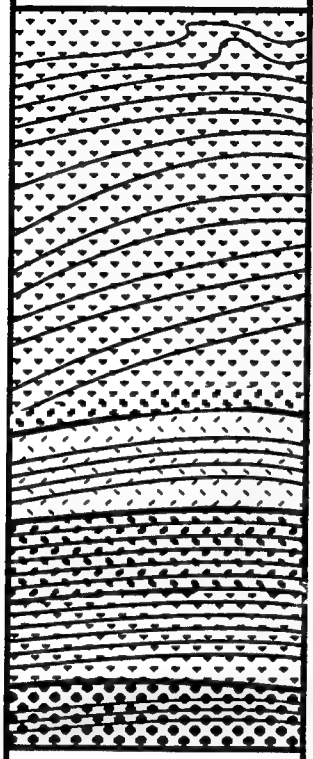


Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
1.9			Gray-yellow fine to slightly medium quartz sand. No real structures visible.
2.0		0.50	Gray fine quartz sand with highly deformed cross-bedding.
1.7	5 E 10 E		Yellow fine-medium quartz sand with cross-beds dipping 10°E. Beds are slightly deformed.
2.0	10 E		Gray fine quartz sand with fine quartz sand cross-beds. Abundant black heavy minerals. Cross-beds are wavy.
1.6	10 W 5 W	1.00	Yellow-gray medium fine quartz sand at top coarsening downward to gray-yellow fine-medium quartz sand. Highly cross-bedded, dipping 5°W.
1.8 1.3	10 E	1.50	Yellow medium quartz sand. Possible cross-beds.
		2.00	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 58 **Date of Coring:** 941023 **Logged by Keil Schmid** **Date Logged:** 941030

Location (FRF coordinates, m)
X (cross shore) = 340.2 **Y (long shore) =** 1005.3 **Z=** -2.55 **(NGVD; top of core)**

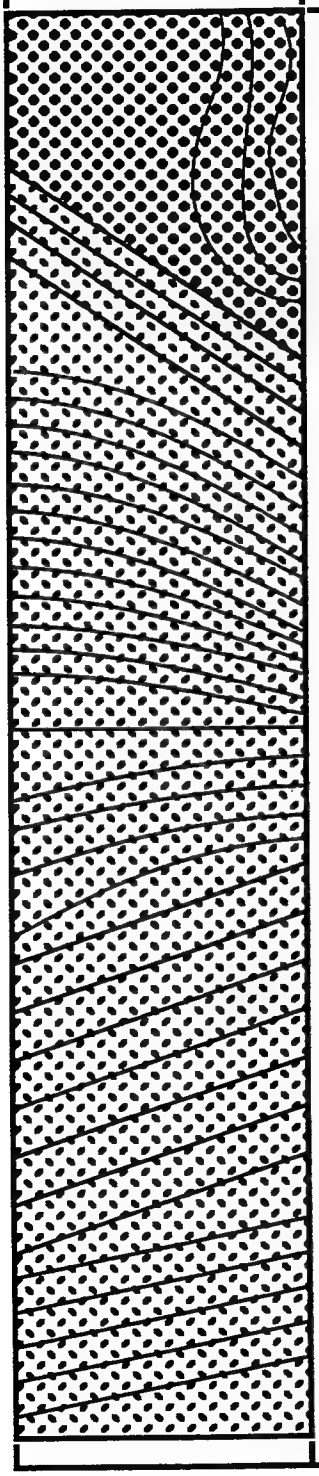


Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	2.0	25 E		Gray fine-medium quartz sand coarsening downwards to yellow medium quartz sand. Highly cross-bedded. Steeply dipping to the east. Dips are steeper at bottom of unit. All cross-beds appear to be deformed.
	1.8	35 E		
		45 E		
		50 E		
			0.50	
	1.5			Sharp contact, dipping 10°E. Dark gray fine quartz sand with faint cross-bedding.
	1.9	10 E		
		5-10 E		Slightly disturbed graded contact dipping 5°E.
	1.5	5 E		Yellow medium quartz sand. Highly cross-bedded 5°E, still slightly disturbed.
	1.8	5 E		Grading into yellow-gray fine-medium quartz sand. Cross-bedded (faint) at 5°E.
	1.2	0		
			1.00	
	1.5	5 E		Fairly sharp contact. Medium-coarse yellow quartz sand. Slight indication of cross beds.
			1.50	
			2.00	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 59 **Date of Coring:** 941023 **Logged by Keil Schmid** **Date Logged:** 941031

Location (FRF coordinates, m)
X (cross shore) = 320.2 **Y (long shore) =** 1006.1 **Z=** -2.09 **(NGVD; top of core)**

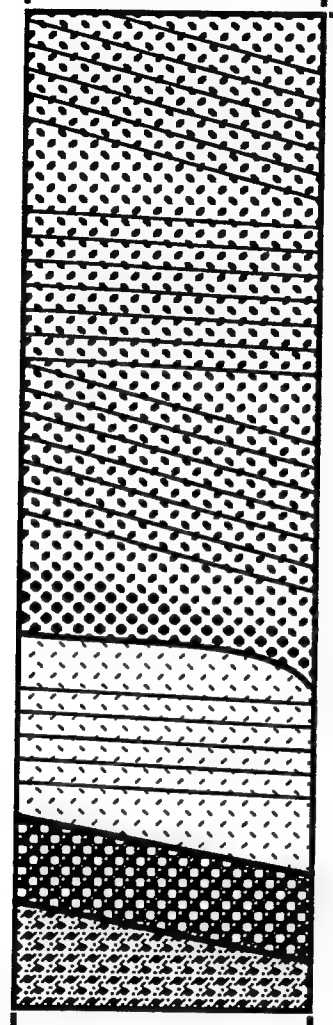


Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
				Top 25cm yellow medium/coarse quartz sand. Disturbed.
	1.2			
			0.25	
	1.5	45 W		Yellow medium quartz sand. Cross-bedded. All slightly disturbed.
		25 W		
		20 W		
		10 W	0.50	
		0 W		
	1.5	10 E		Shift from offshore dips to onshore dips.
		20 E		
			0.75	
		10 E		Faint contact
	1.8		1.00	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 60 **Date of Coring:** 941023 **Logged by Keil Schmid** **Date Logged:** 941027

Location (FRF coordinates, m)
X (cross shore) = 160.0 **Y (long shore) =** 940.2 **Z=** -0.95 **(NGVD; top of core)**

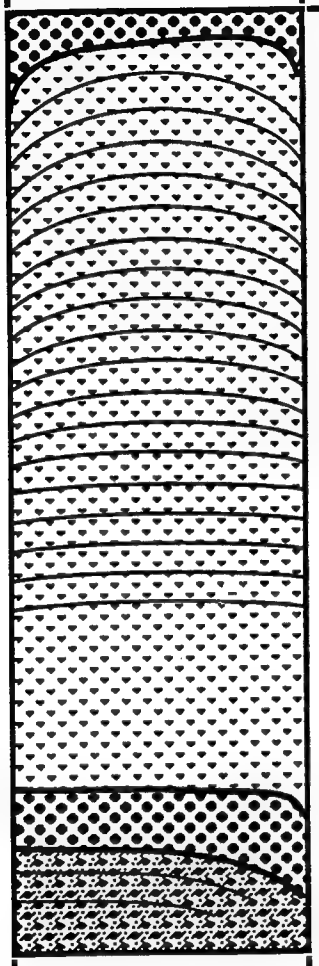


Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.8	25 W		Yellow gray medium quartz sand. Fining-upward sequence. Coarser grained cross-beds throughout. Dip angles change with depth, but are uniformly to the west.
		5 W		
	1.6	5 W		
			0.5	
	1.7	25 W		
		25 W		
	0.8	5 W		
			1.0	
	2.1	5 W		Sharp contact at 5°W. Erosional gray fine quartz sand cross-beds dipping 5°W.
		5 W		
		20 W		Large cross-bed of coarse sand dipping 20°W Bimodal distribution of sand sizes.
	0.5	20 W		
	1.3			Poorly sorted gray-yellow fine-medium quartz sand with gravel.
			1.5	
			2.0	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 61 **Date of Coring:** 941023 **Logged by Keil Schmid** **Date Logged:** 941031

Location (FRF coordinates, m)
X (cross shore) = 154.8 **Y (long shore) =** 940.3 **Z=** 1.19 **(NGVD; top of core)**

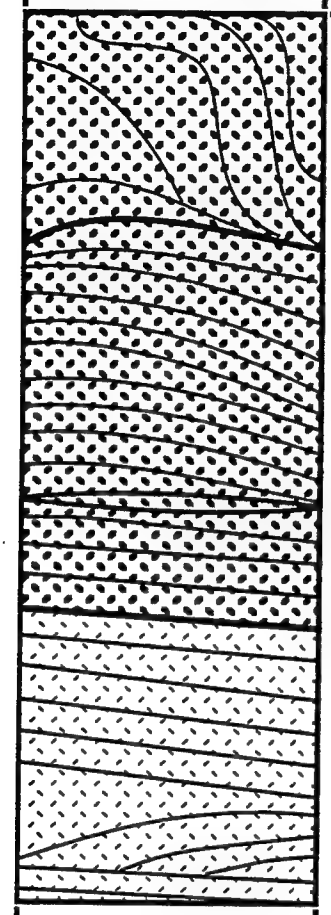


Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.2			Yellow-brown medium-coarse quartz sand. Curved horizontal contact. Sharp.
	1.7			Gray-yellow medium/fine quartz sand. Very faint indications of slightly curved cross-beds. No grain size difference between beds.
		?		
		?	0.50	
	1.7		1.00	
	1.5			
	1.0			Medium/fine quartz sand. Grading into medium/coarse sand.
	1.7	8 W		
	1.2			
			1.50	
			2.00	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 62 (top) **Date of Coring:** 941025 **Logged by Keil Schmid** **Date Logged:** 941102

Location (FRF coordinates, m)
X (cross shore) = 320.7 **Y (long shore) =** 940.8 **Z=** -2.50 **(NGVD; top of core)**

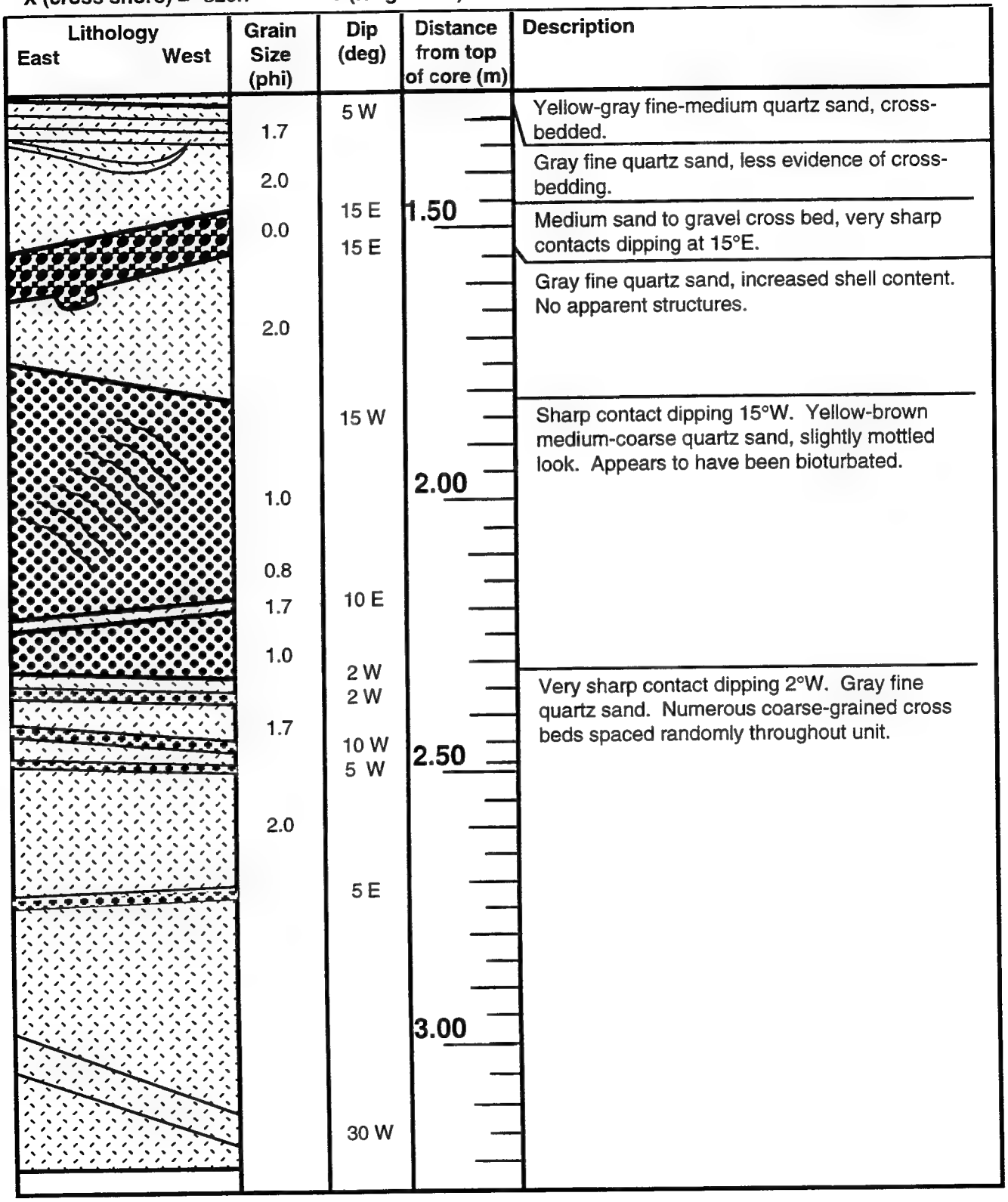


Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.7		0.3	Medium quartz sand. Deformed structures.
	1.7	20 W	0.50	Yellow medium quartz sand Highly cross-bedded. Cross beds are closely spaced and all dip onshore (W). Coarsing upwards sequence.
		30 W		
		20 W		
	1.8	15 W		
		10 W		
	1.9	10 W		
		15 W	1.00	Faint contact, dipping10°W Gray fine quartz sand Larger cross-beds than above.
	2.1			
		35 E		
	1.8			
			1.50	
			2.00	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 62 (bot) **Date of Coring:** 941025 **Logged by Keil Schmid** **Date Logged:** 941102

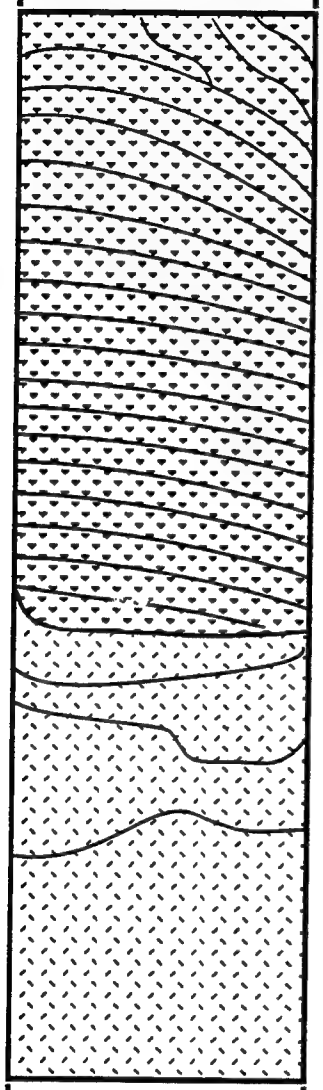
Location (FRF coordinates, m)
X (cross shore) = 320.7 **Y (long shore) =** 940.8 **Z=** -2.50 **(NGVD; top of core)**



Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 63 (top) **Date of Coring:** 941025 **Logged by Keil Schmid** **Date Logged:** 941102

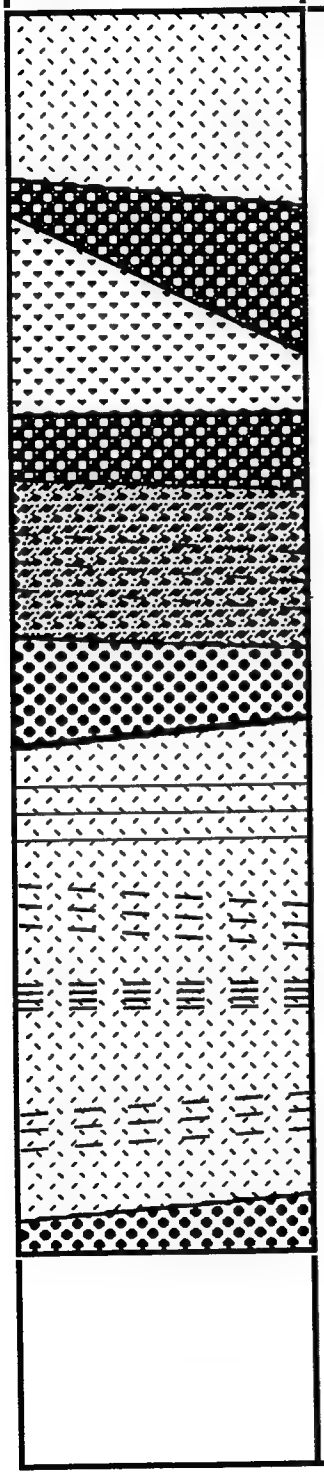
Location (FRF coordinates, m)
X (cross shore) = 317.5 **Y (long shore) =** 940.8 **Z=** -2.59 **(NGVD; top of core)**

Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	1.8	40 W 30 W 20 W	0.50	Yellow-gray medium-fine quartz sand cross-bedded. Cross beds are disturbed from top of core to about 30 cm below top of core. All cross beds dip onshore and are slightly curved. Cross-beds are slightly coarser than other sand.
	1.8	25 W	1.00	Gray fine quartz sand. Not many cross-beds. Some wavy (disturbed?) cross beds.
	2.1		1.50	
			2.00	

Duck94 Field Studies of Nearshore Sedimentary Structures

Vibracore # 63 (bot) **Date of Coring:** 941025 **Logged by Keil Schmid** **Date Logged:** 941102

Location (FRF coordinates, m)
X (cross shore) = 317.5 **Y (long shore) =** 940.8 **Z=** -2.59 **(NGVD; top of core)**



Lithology East West	Grain Size (phi)	Dip (deg)	Distance from top of core (m)	Description
	2.1			Apparently structureless gray fine quartz sand.
		10 W		
	1.0			Fairly sharp contact dipping 10°W Yellow brown coarse quartz sand
			2.00	Very steeply dipping contact.
		40 W		Gray fine-medium quartz sand, increase in fragile shell fragments. Fairly sharp contact.
	1.8			
	1.0	0 W		Yellow-brown coarse quartz sand. Fairly sharp contact.
	0.5	5 W		
	1.7	10 W		Gray poorly sorted fine to slightly coarse quartz sand. Definite increase in delicate shells. Appears to be cross-bedded. Fairly sharp contact.
		5 W		Yellow-brown medium-coarse quartz sand slight mottling. Well-rounded grains. Some shell frags.
	0.8		2.50	
		15 E		Extremely sharp erosional contact. Gray fine quartz sand with distinctly coarser cross beds.
		0		
	2.0			
	1.7	10 W		
	2.0			
	1.7			
			3.00	
	1.8			
		20 E		
	0.8			
			3.50	

CORE # 7 TOTAL LENGTH: 1.49

Page 1 of 2 X-RAY LOGGED BY: E. Kane 9/9/96

Proper orientation unknown. Relative directions indicated here.

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
0	0	Horizontal beds (very faint) indicated by
		aligned shell fragments, fine-med sand.
0.03	40	Cross beds. Bedding indicated by aligned
	->	shell fragments. Dip increases with depth.
		Beds very likely disturbed by coring.
0.09	40	Change in direction of dip
	<-	
0.14	70	Dip of structures increases abruptly.
	<-	Structures are apparently flow structures
		(Due to coring).
0.30	35	Flow structures change directions. Dips
	->	are shallower. Shell fragments are not
		uniformly aligned.
0.37	15	Structures resemble bedding
	<-	
0.40	--	Structureless (either by nature or coring)
0.74	35	Faint beds, possibly bowed by coring.
	<-	
0.83	12	Bedding preserved, undisturbed.
	<-	
0.86	0	Dip decreases.
0.90	25	Concave upward beds (e.g. synclinal) both
	-><-	arms dipping equally med sand.
0.97	20	Increase in coarse fraction and shell
	-><-	fragment content(Beds still concave upward)
1.09	20	Gradual increase in avg. grain size and
	-><-	content (Med-coarse sand)
1.14	15	15 mm thick bed of markedly lower shell
	-><-	content

CORE # 7 TOTAL LENGTH: 1.49

Page 2 of 2 X-RAY LOGGED BY: E. Kane 9/9/96

Proper orientation unknown. Relative directions indicated here.

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
1.16	15	8 mm thick bed w. very high shell content
	-><-	
1.17	10	Decreasing shell content
	-><-	
1.20	8	Abrupt decrease in shell content (~0%)
	-><-	
1.25	20	Crossbeds of different dip/orientation,
	<-	truncated cleanly across top (@ 1.25m)
1.30		Apparently massive/structureless.
1.35	0	Faint bedding.
1.36	0	Bedding clearer-slightly higher shell
		content (sand-sized fragments)
1.44	0	Shell fraction abruptly decreases to near 0.
		Lens of shell fragments indicates dip = 0.
1.49		End of film and log.

CORE # 9
Page 1 of 1

TOTAL LENGTH: 1.13m

X-RAY LOGGED BY: E. Kane 9/9/96, 9/11/96

First film ("0.0 - 0.4") Begins at 0.065 m

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
0.065	--	Coarse sand & gravel (to 20mm). Little indication of bedding. Elongated grains dip from 60°W to 60°E (common)
0.17	--	Very few elongated grains. Apparently massive coarse sand & gravel, poorly sorted.
0.58	20 W	Faint bed. Lower gravel fraction - poorly sorted.
0.65	?	Gap in core (60 mm). Mud or sand with gravel?
0.71		Increase in avg. grain size - moderately sorted-fine gravel to coarse sand.
0.74	20 W	Fairly distinct bedding
0.85	15 W	Dip decreasing. Bedding more faint
0.86	5 W	(Dip decreasing)
0.87	--	Mud or sand w. coarse sand to gravel size grains (<10%)
0.88		Return to fine gravel - coarse sand - no indications of bedding.
0.91	0	Horizontal Bed? (Faint)
0.94	30 E	Offshore dipping bed.
0.95	--	No indications of bedding
0.98	--	Finer sediment - fine sand (presumed) with occasional coarse sand to fine gravel size shell fragments. Massive.
1.09	0	Sand to gravel size sediment, very poorly sorted.
1.13	--	End of core & log.

CORE # 10 TOTAL LENGTH: 1.20 (?) m

Page 1 of 1 X-RAY LOGGED BY: E. Kane 9/11/96

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
0	--	Massive sand w. occasional coarse sand-sized shell fragments.
0.36	20 E	Faint bed. Slightly coarser avg. grain size.
0.42	15 E	Fairly distinct beds, ~5mm thick, w. higher fraction of coarse sand size shell fragments. Beds are bowed sharply downward (to vertical) on offshore (E) side of core (disturbed by coring)
0.46	--	Return to massive sand w. occasional coarse sand sized shell fragments.
0.77	--	Avg. grain size increases to med-coarse sand. Massive.
0.97		Massive fine-med (presumed) sand. Shell fragments rare.
1.07	15 W	Shell fragments more common. Fairly distinct beds, convex upward but asymmetric - Longer "arm" dips onshore (w).
1.12	15 (<-->)	Convex upward beds become symmetric
1.13	25 E	Convex upward beds asymmetric - Longer arm dips offshore (E)
1.16	--	Slight increase in avg. grain size. Moderately sorted massive med. sand.

CORE # 11
Page 1 of 1

TOTAL LENGTH: 1.6 m (?)
X-RAY LOGGED BY: E. Kane 9/11/96

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
0	--	Fine-med (presumed) sand w. faint vertical flow structures, no bedding.
0.48	--	Segment w. slightly coarser avg. grain size, higher shell fraction. No bedding preserved (if present at all)
0.55	--	End of coarser segment.
0.73	--	Slightly coarser section.
0.80	--	End coarser section.
0.90	~70 (<-->)	Sharply bowed layers, convex upward, symmetric
1.10	25 (<-->)	Less sharply bowed layer, convex upward, symmetric
1.02	--	Massive
1.13	0	Faint horizontal bed, ~10mm thick. Very faint indications of horizontal beds from 1.13 to 1.31 m.
1.31	10 (-><-)	Distinct beds up to 3 mm thick, slightly concave upward, symmetric. Common coarse to very coarse sand size shells.
1.51	0	Gravel sized shells, pebbles, & coarse sand, apparently horizontal bedding.
1.56	7 W	Return to fine-med sand with 1-3mm thick beds. Occasional coarse shell fragments.
1.58	7 W	Slight increase in avg. grain size.
1.60	--	End of film/log.

CORE # 12
Page 1 of 2

TOTAL LENGTH: 1.69 m (film) (core length ?)
X-RAY LOGGED BY: E. Kane 9/11/96, 9/13/96

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
0	--	Very faint flow structures. Fine-med sand with common coarse sand shell fragments
0.50	25 W	Possible very faint bedding
0.54		Bottom of bedding, return to massive sand (fine-med w. occasional coarse shell fragments)
0.92	45 W	Very faint bedding
0.98	40 W	Distinct bed of coarser sand w. higher fraction of shell fragments, 8 mm thick
1.02	30 W	Fairly distinct bed of slightly coarser sand.
1.04	20 W	Dip decreasing. Avg. grain size slightly coarser
1.06	20 E	Dip changes directions. Grain size & composition roughly the same as above.
1.13	20 W	Dip reverses again. Texture & composition unchanged.
1.16	0	Dip decreases. Slightly coarser beds w. slightly higher shell fraction.
1.18	0	Finer avg. grain size (fine-med sand) w. less shell. Faint horizontal beds.
1.21		No film of 1.21 m to 1.26 m. Presumed same as above.
1.28	10 E	Higher fraction of coarse shell fragments. Beds more distinct, 3-10mm thick. Coarsening downward interval to 1.43 m.

CORE # 12
Page 2 of 2

TOTAL LENGTH: 1.69 m (film) (core length ?)
X-RAY LOGGED BY: E. Kane 9/11/96, 9/13/96

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
1.39	5 E	Med to very coarse sand w. abundant med-coarse sand shell fragments.
1.43	4 E	Abrupt change to finer sed (fine-med sand) w. occasional med sand shell fragments. Thin (1-3 mm) beds.
1.60	10 E	Dip increases slightly
1.64	20 E	Dip increases. Slightly higher shell fraction & avg. grain size.
1.65	5 E	Dip decreases, slight decrease in shell fraction & avg. grain size.
1.69	5 E	End of film (apparently not end of core)

CORE # 22 TOTAL LENGTH: 1.78 m

Page 1 of 2 X-RAY LOGGED BY: E. Kane 9/13/96

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
0		Massive fine-med sand w. minor shell content.
0.68	N/A	Bowed beds (disturbed by coring) ~10 mm thick. Common med-grained shell fragments.
0.78	--	Massive sand w. minor shell content
1.06	30 E	Faint bed w. slightly higher shell content.
1.07	--	Massive fine-med sand.
1.17	40 W	Fairly distinct beds w. slightly higher shell content
1.23	30 W	Slight decrease in dip
1.26	20 W	Slight decrease in dip, coarse shell fraction increases.
1.30	20 E	Well-defined contact. Change in dip direction. Texture, content similar to above (med sand w. common coarse shell fragments)
1.36	10 W	Well-defined contact. Change in dip direction. Fine-med sand w. occasional med shell fragments. Beds 1-4 mm thick.
1.42	5 W	Dip decreases
1.47	25 E	Very sharp contact. Change in dip direction. Slightly coarser avg. grain size (med sand) with common med shell fragments.
1.52	0	Grain size increases to coarse sand. Dip decreases.
1.53	20 E	Avg. grain size increases slightly (still coarse sand) Dip very faint.

CORE # 22 TOTAL LENGTH: 1.78 m

Page 2 of 2 X-RAY LOGGED BY: E. Kane 9/13/96

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
1.56	20 W	Well-defined contact. Change in dip
		direction. Fine-med sand with occasional
		med shell fragments.
1.60	10 W	Dip decreasing. Shell content increasing
		(Common).
1.62	10 E	Increase in avg. grain size (med sand).
		Faint contact. Change in dip direction.
1.66	10 E	Bed of med-coarse sand, ~8 mm thick.
1.68	10 E	Occasional pebbles (in med-coarse sand)
1.70	10 E	Bed of med-coarse sand, ~8 mm thick.
1.71	?	Bedding unclear. Med sand.
1.78		End of core.

CORE # 23 TOTAL LENGTH: 1.62 m

Page 1 of 1 X-RAY LOGGED BY: E. Kane 9/13/96

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
0		Massive fine-med sand
0.77		Common med shell fragments. Med sand.
0.93		Nearly vertical flow structure along
		boundary between med sand w. common shell
		fragments (above) and massive fine-med
		sand w. minor shell fragments (below).
1.13	22 W	Slight increase in avg. grain size, to med
		sand. Faint bedding.
1.21	30 W	Increase in dip.
1.27	10 W	Decrease in dip.
1.29	--	Decrease in avg. grain size, to fine-med
		sand. No discernible bedding.
1.37	10	Faint beds of fine-med sand, 1-5 mm thick,
	(-><-)	symmetrically concave upward
1.44	8 E	Faint offshore-dipping bed
1.45	--	No discernible bedding. Fine-med sand.
1.59	5 E	15 mm thick bed of med sand w. common
		shell fragments
1.60	--	No discernible bedding. Fine-med sand.
1.62		End of core.

CORE # 24 TOTAL LENGTH: 1.91 m

Page 1 of 1 X-RAY LOGGED BY: E. Kane 9/13/96

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
0	--	Fine-med sand w. occasional coarse shell fragments. Faint vertical flow structures.
0.85	--	Common med. shell fragments.
0.99	--	Coarse sand - fine gravel w. common coarse shell fragments.
1.05	0	Gradational contact w. med sand. Very faint indication of dip (aligned shell fragments)
1.25	12 (<-->)	Very faint convex upwards beds, symmetric.
1.26	?	No discernible bedding.
1.28	15 E	Very faint offshore dipping beds.
1.31	15 E	25 mm pebble in med sand.
1.38	15 E	Bedding becomes extremely faint but no indication of changing dip.
1.40	>15E?	Dip may be increasing
1.48	40 E	Very faint bedding. Dip has increased. Occasional grains of very coarse sand/ fine gravel.
1.52	--	No discernible bedding. Fine-med sand.
1.66	20 W	Faint bed (?), dipping onshore
1.67	--	No discernible bedding
1.77	28 W	Very faint bedding (?) (blurry x-ray)
1.91		End of core

CORE # 25 TOTAL LENGTH: 1.49 m

Page 1 of 2 X-RAY LOGGED BY: E. Kane 9/15/96

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
0	--	Massive fine med sand w. occasional very
		coarse grains (<<1%), no shell fragments.
0.15	--	Very coarse grains increasing. Core appears
		disturbed by coring. Coarse fraction ~1-2%
0.26	--	Sudden increase in very coarse fraction
		(~20%). Grading to coarse sand.
0.36	--	Moderately sorted coarse-very coarse sand.
		Massive
0.46	--	Massive poorly sorted coarse sand to fine
		gravel
0.50	--	Large pebble (35 mm-45 mm) in coarse sand-
		Fine gravel.
0.54	E	Bedding contact w. fine-med sand. Contact
		is disturbed, angle not measured.
0.60	35 E	2mm thick bed. Dip conforms to that of
		contact above - Assume similar dips between
		0.54m & 0.60m
0.65	25 E	Dip decreases slightly. No indications of
		bedding between 0.60m & 0.65m, but presume
		similar dips in the interval.
0.70	20 E	Slight decrease in dip. Faint indications
		of bedding between 0.65m & 0.70m.
0.78	0	Faint indications of steadily decreasing
		dip from 0.70m to 0.78m.
0.79	0 (?)	No indications of bedding - assume 0° dip
		based on cracks at 0.86m & 0.98m (see below)
0.86	0 (?)	Horizontal crack in core indicates possible
		bedding plane w. 0° dip.

CORE # 25 TOTAL LENGTH: 1.49 m

Page 2 of 2 X-RAY LOGGED BY: E. Kane 9/15/96

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
0.98	0 (?)	Horizontal crack in core indicates possible
		bedding plane w. 0° Dip.
1.03	8	Common med-coarse shell fragments. Faint
	(->><-)	concave upward symmetrical beds.
1.07	20 E	Faint contact w. offshore-dipping beds.
1.09	--	No indications of bedding. Common coarse
		sand to fine gravel grains (disturbed
		section?)
1.13	0	Sharp horizontal contact w. poorly sorted
		coarse sand-fine gravel. Common med-coarse
		shell fragments. No indications of bedding
		below contact.
1.20	0	Sharp horizontal contact w. fine-med sand.
		Sand coarsens downward.
1.25	0	Common fine-med shell fragments, faint
		bedding
1.28	0	Abundant med shell fragments.
1.29	0	Med-coarse sand w. abundant med-coarse
		shell fragments. Still coarsening downwards.
1.32	0	Very coarse sand-fine gravel.
1.33	?	Bedding indiscernible, possibly horizontal?
		Coarsening downward trend continues to
		bottom of core.
1.46	?	Large pebble (35mm x 15mm) in very coarse
		sand to fine gravel
1.49		End of core.

CORE # 26 TOTAL LENGTH: 1.69 m

Page 1 of 2 X-RAY LOGGED BY: E. Kane 9/15/96

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
0	--	Fine-med sand w. occasional med shell
		fragments. Vertical flow structures
		(disturbance by coring).
0.23	--	Patch of coarse grains in fine-med sand
		(coarse fraction ~10%)
0.26	--	Return to fine-med sand w. vertical flow
		structures.
0.45	--	Common med-coarse shell fragments.
		Vertical flow structures persist.
0.63	--	Abundant med-coarse shell fragments.
		Vertical flow structures persist.
0.85	--	Shell fragments abruptly uncommon. Flow
		structures persist. Fine-med sand.
1.02	30 W	First (apparently) undisturbed beds. Fine-
		med sand w. common med shell fragments.
1.05	?	Bedding indiscernible. Fine-med sand
		w. occasional med shell fragments.
1.22	30 W	Faint bedding. Fine-med sand w. occasional
		med shell fragments.
1.28	25 W	Dip gradually decreasing. Beds much more
		distinct
1.30	10 W	Dip gradually decreasing. Beds much more
		distinct
1.33	8 W	Dip gradually decreasing. Beds becoming
		more faint
1.42	0	Horizontal bed contact?
1.43	20 W	Sudden increase in dip. Similar material.

CORE # 26 TOTAL LENGTH: 1.69 m

Page 2 of 2 X-RAY LOGGED BY: E. Kane 9/15/96

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
1.46	20 W	Slight coarsening downward trend.
1.49	10 W	Gradual decrease in dip. Med-coarse sand.
1.50	0	Coarse sand-fine gravel layer, 1 cm thick
1.51	0	Sharp contact w. fine-med sand. Bedding very faint.
1.52	15 W	Very faint bedding.
1.58	0	Dip decreases. Bedding more distinct, slight increase in shell fragments.
1.62	15 W	Increase in dip.
1.69		End of core.

CORE # 27 TOTAL LENGTH: 1.70 m

page 1 of 2 X-RAY LOGGED BY: E. Kane 9/15/96

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
0	--	Fine-med sand w. common coarse shell
		fragments. Vertical flow structures
		(Disturbance by coring)
0.49	--	Remnants of bedding, disturbed by coring.
0.87		Decreasing shell content. Bed is disturbed
		by coring.
0.89	25 W	Undisturbed bedding.
0.93	15 W	Decreasing dip. Shell fragments nearly
		absent.
1.00	10 W	Minimum dip (of this interval)
1.01		Dip gradually increasing
1.05	15 W	Dip gradually increasing
1.10	20 W	Dip gradually increasing. Coarsening
		downward, increasing shell fragments.
1.19	25 E,	Asymmetric, convex upward contact, sharp.
	40 W	Below contact:
		Fine-med sand w. almost no shell fragments.
1.21	35 W	Fine-med sand.
1.27	15 W	(Presumed gradual) decrease in dip.
1.29	10 W	(Presumed gradual) decrease in dip.
1.31	3 E	Change in dip direction
1.35	~0	Bedding very faint, near horizontal.
1.37	~0	End coarsening downward sequence, return
		to fine-med sand w. few shell fragments.

CORE # 27 TOTAL LENGTH: 1.70 m

Page 2 of 2 X-RAY LOGGED BY: E. Kane 9/15/96

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
1.50	0	Horizontal contact w. med sand, coarsening
		downward slightly to med-coarse sand.
		Bedding faint below contact.
1.55	~20 E	Contact w. fine-med sand. Bedding below
		contact faint, dipping offshore.
1.63	30 E	Faint bedding.
1.68		Bedding indiscernible.
1.70		End of core.

CORE # 32 TOTAL LENGTH: 1.68 m

Page 1 of 2 X-RAY LOGGED BY: E. Kane 9/16/96

No offshore direction indicated on film

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
0	--	Massive or disturbed fine-med sand w. common coarse shell fragments. Possible vertical flow structures.
0.54	55->	Disturbed bedding.
0.67	~55->	Med-coarse sand. Bedding disturbed
0.70	~55->	Fine-med sand w. occasional med-shell fragments.
0.88	30->	Fine-med sand w. abundant shell fragments
0.90	--	Same material - Bedding indiscernible. Grading to medium sand.
1.01	50<-	Contact w. fine-medium sand. Contact dips opposite bedding above. Possibly disturbed by coring.
1.05	15->	Very faint bedding. Dip is opposite that of contact above.
1.10	25->	Dip increasing, beds becoming clearer.
1.18	25->	Dip constant from 1.10-1.18
1.21	10->	Dip decreasing
1.24	0	Thin (1-2 mm) horizontal beds, slightly convex upward. (fine-med sand w. common shell fragments)
1.30	25-> (20<-, 0)	Common coarse shell fragments. Faint cross-bedding. Horizontal to left-dipping beds on left side of core are truncated by right-dipping beds on right side of core.

CORE # 32 TOTAL LENGTH: 1.68 m

Page 2 of 2 X-RAY LOGGED BY: E. Kane 9/16/96

No offshore direction indicated on film

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
1.35	0	Contact. Thin horizontal beds. Fine med sand w. occasional med shell fragments
1.41	0,10<-, 30->	Cross bedding in fine-med sand w. common med shell fragments.
1.46	5<-	Sub-Horizontal contact. Bedding just below contact presumed horizontal.
1.47	~0	Elongated pebble (20 mm x 5 mm) oriented near horizontal.
1.49	0	Very faint horizontal bedding.
1.54	0	Bedding becoming more distinct.
1.57	10->	Sharp horizontal contact w. right-dipping beds (fine-med sand w. common med shell fragments) Beds are 1-2 mm, distinct.
1.60	8->	Dip decreasing slightly
1.64	->	Beds warped, still dipping gently to right.
1.69		End of core.

CORE # 33 TOTAL LENGTH: 0.97 m (?)

Page 1 of 1 X-RAY LOGGED BY: E. Kane 9/16/96

No offshore direction known

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
0	<-	Med sand w. abundant med shell fragments.
		Dip presumed to conform to that of lower
		beds.
0.05	~30<-	Fine-med sand w. abundant med shell
		fragments in 2-5 mm asymmetric convex-
		upward beds (beds disturbed by coring)
		presumed original dip indicated here.
0.16		Dips becoming shallower
0.28	(0?)	Symmetric convex-upward beds
	20(<-->)	(original dips presumed to be horizontal)
0.36	0?	Bedding very faint
0.47	15<-,	5-7mm thick asymmetric convex upward bed
	38->	
0.49	20(<-->)	5mm thick symmetric convex upward beds
	(0?)	
0.60	10<-,	Beds becoming asymmetric
	20->	(Original dips to left?)
	(10<-?)	
0.70	20<-	Dips becoming solely leftward.
0.87	8<-	Dips becoming shallower
0.90	0	Horizontal beds
0.97		End of core (?)

CORE # 34 TOTAL LENGTH: 1.36 m

Page 1 of 2 X-RAY LOGGED BY: E. Kane 9/17/96

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
0	--	Fine-med sand w. common med-coarse shell fragments. Possible vertical flow structures, indicated by vertical cracks in core.
0.32	35 W	Faint bedding, disturbed by coring (dip becomes vertical near offshore side of core).
0.40	--	No offshore direction noted from 0.4m to 0.64m. Irrelevant though, as core is largely destroyed in this interval - no structures could be discerned. Material is fine-med sand w. common med-coarse shell fragments.
0.64	~20 E	Thin (1-5 mm) faint beds of fine-med sand w. occasional shell fragments.
0.68	18 E	Beds are warped vertically downward on onshore side of core.
0.72	10 E	Dip decreasing. Beds still warped sharply.
0.77	(40 W)	Presumed anomalous dip - faint bed dipping steeply offshore conforms to dips of warped portions of above beds.
0.81	10 W	Faint beds of fine-med sand w. common med shell fragments. Dip presumed to be true apparent dip of beds.
0.88	10 W	Fine-med sand w. common med shell fragments, occasional coarse shell fragments.
1.03	10 W	Fairly distinct contact w. fine-med sand w. abundant coarse shell fragments. 3-5 mm beds. Coarse shell fragments become less abundant w. depth (fining downward sequence)
1.10	5 W	Sharp contact

CORE # 34 TOTAL LENGTH: 1.36 m

page 2 of 2 X-RAY LOGGED BY: E. Kane 9/17/96

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
1.10	15 W	Fine to med sand w. common med shell
		fragments (increasing w. depth)
1.15	15 W	Fine-med sand w. no shell fragments.
1.17	8 W	Med sand w. abundant shell fragments.
1.21	6 W	Fine-med sand w. common shell fragments.
		Beds are warped vertically downward on
		onshore side of core.
1.27	0	Bedding very faint. Dips have apparently
		decreased to horizontal.
1.36		End of core. Bedding indiscernible.

CORE # 35 TOTAL LENGTH: 1.69 m ? ?

Page 1 of 2 X-RAY LOGGED BY: E. Kane 9/17/96

No offshore direction noted

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
0	--	Apparently massive fine-med sand w. common med-coarse shell fragments.
0.14	5->	Faint beds, 2-4mm thick, of fine-med sand w. abundant med shell fragments. Beds are warped vertically upward on right side of film.
0.16	0	Dip decreases, changes direction. Beds still warped on right.
0.18	13<-	Beds still warped on right.
0.21	12<-	Dip increasing.
0.26	20	
0.28	<-	Beds warped steeply downward on left side of film. "True" dip cannot be determined, but is to left.
0.44	<-	Coarsening downward sequence, med-coarse sand w. occasional med-coarse shell fragments at top. (Beds warped)
0.49	<-	Med-coarse sand w. abundant coarse shell fragments
0.50	<-	Sharp contact w. fine-med sand w. rare med shell fragments. Beds warped steeply on both left (down) and right (up)
0.59	13<- (?)	"True" dip? Two 4 mm thick beds of fine-med sand w. no shell fragments. Beds are warped on left & right sides of film, but middle appears undisturbed.
0.61	10<-	Fine-med sand w. occasional med shell fragments. Bedding becomes very faint.

CORE # 35 TOTAL LENGTH: 1.69 m ? ?

Page 2 of 2 X-RAY LOGGED BY: E. Kane 9/17/96

No offshore direction noted

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
0.69	?	Film missing 0.69 - 1.02 m
1.02	--	Apparently massive fine-med sand w. common
		med-very coarse shell fragments.
1.15	3->	Faint 2-3 mm thick beds of fine-med sand
		w. common med shell fragments.
1.17	4<-	Dip reverses, increases w. depth.
1.19	15<-	Dip increasing in depth.
1.27	30<-	Fine-med sand w. abundant med-coarse
		shell fragments.
1.30	<-	Beds too warped (downward on left of film)
		to get reliable dips. Beds 3-5 mm thick.
1.40	(30<-)	"True" dip? (Beds still warped sharply
		downward on left side of film)
		1.3 m to 1.69 m missing. 0.3-0.69 m
		x-rayed & mis-labeled as 1.3-1.69 m.
		(End of log)

CORE # 36 TOTAL LENGTH: 1.41

Page 1 of 2 X-RAY LOGGED BY: E. Kane 9/18/96

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
0	--	Fine-med sand w. occasional coarse grains.
		Apparently massive.
0.28	?	Fine-med sand w. common med-coarse shell
		fragments. Bedding disturbed by coring.
0.38	?	Occasional shell fragments, med grained.
0.62	?	5-15 mm thick band of med coarse sand
		and coarse shell fragments.
0.70		Contact? (disturbed if present) w. fine-
		med sand w. no shell fragments.
0.73		Fine-coarse sand. Coarse fraction
		decreases w. depth.
0.82	0	Very faint horizontal bed of fine-coarse
		sand, ~20 mm thick.
0.84	0?	Fine to medium sand.
0.85	0	Faint thin beds of fine-med sand. Shell
		fraction increasing from occasional at top
		to abundant at bottom.
0.90	0	Fine-med sand w. abundant med-coarse
		shell fragments. Contact w. fine-med sand
		w. rare shell fragments.
0.94	8 W	Dips increasing.
0.98	20 W	Dips increasing. Common med-coarse shell
		fragments.
1.04	10 W	Dips decreasing. Beds becoming more faint,
		shell fraction decreasing.
1.10	25 W	Dips increase. Shell fraction increasing
		w. depth.

CORE # 36 TOTAL LENGTH: 1.41

Page 2 of 2 X-RAY LOGGED BY: E. Kane 9/18/96

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
1.14	25 W	Abundant med-coarse shell fragments in med sand
1.15	25 W	Sudden decrease in shell fragments.
1.18	25 W	Med sand w. abundant med shell fragments.
1.20	25 W	Sudden decrease in shell fragments. Contact w. med-coarse sand, coarsening downward.
1.24	13 W	Fine-med sand w. common med shell fragments. Coarsening downward. Bedding faint to totally indiscernible.
1.30	?	Med-coarse sand w. common shell fragments.
1.36	5 W	Med-coarse sand w. abundant med-coarse shell fragments. Avg. grain size still increasing w. depth.
1.41		End of core

CORE # 37 TOTAL LENGTH: _____

Page 1 of 2 X-RAY LOGGED BY: E. Kane 9/18/96

*No offshore direction indicated on film. Field log has offshore dir.indicated

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
0	?	Fine-med sand. Apparently massive (But may have indiscernible bedding)
0.13	20->	Very faint bedding.
0.24	20->	Faint bedding (assume that interval from 0.13 m-0.24 m conforms to dips at 0.13 & 0.24 m)
0.34	(10->)?	Crack in core may indicate dip.
0.35	--	No discernible bedding.
0.40	--	Med-coarse sand w. no discernible bedding.
0.68	-	Apparently massive fine-med sand.
0.80	36<-, 60<-	Fine-med sand, w. bedding, likely disturbed from original orientation.
0.87	<-	Fine-med sand w. common very coarse shell fragments. Bedding too disturbed to get reliable dips.
0.91	30<-	Faint bedding (same material) & occasional v. coarse sand grains. Coarse grains & shell fragments increasing w. depth.
1.00	30<-	Sharp contact w. fine-med sand with common med shell fragments. Faint bedding conforms w. dip of contact.
1.07	0 (?)	20 mm thick bed of fine-med sand w. common very coarse grains.
1.10	0	Very faint bedding in fine-med sand.
1.15	17->	Faint bedding (same material) (Bedding has gradually reversed from that at 1.00m)

CORE # 37 TOTAL LENGTH: 1.59 m

Page 2 of 2 X-RAY LOGGED BY: E. Kane 9/18/96

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
1.18		Bedding too faint to see.
1.21	20->	Extremely faint bedding.
1.25	12->	Faint contact w. fine-med sand w. common med shell fragments.
1.29	25<-	Dip reverses direction. Bedding is too faint to tell whether reversal is gradual or abrupt.
1.35	(25<-->) ?	Symmetric, chevron-shaped bed - possibly anomalous, due to crack in core.
1.37	5->	3-8 mm thick beds, alternating fine-med sand w. abundant med shell fragments and fine-med sand w. occasional med shell fragments.
1.41	10->	Bedding becoming faint. Fine-med sand w. common med shell fragments.
1.49	0	Faint horizontal beds. Same material, grading to med-coarse sand at end of core.
1.59		End of core.

CORE # 38 TOTAL LENGTH: 1.58 m

Page 1 of 2 X-RAY LOGGED BY: E. Kane 9/18/96

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
0	--	Fine-med sand w. occasional med-coarse shell fragments. No discernible bedding.
0.17	W	Very faint disturbed bedding, steeply dipping offshore (could not get reliable dip measurement)
0.30	--	No discernible bedding.
0.42	E	Faint disturbed bedding, dipping offshore, warped sharply downward on offshore side of core. Fine-med sand w. common med shell fragments, coarsening downward.
0.52	E	Med-coarse sand. Abundant med-coarse shell fragments.
0.53	E	Contact w. fine-med sand. Common med shell fragments - coarsening downward.
0.70	E	Med-v. coarse sand w. common med shell fragments.
0.71		Fine-med sand w. occasional med shell fragments.
0.77	45 W	Onshore dipping bed? Crack in core.
0.80	?	No discernible bedding.
0.86	10 W	Very faint bedding (fine-med sand w. common med shell fragments)
0.91	10 W	Gradational contact w. med-coarse sand.
1.04	10W(?)	Contact w. fine-med sand w. rare shell fragments. Contact is warped steeply downward on onshore side. No discernible bedding below contact.

CORE # 38 TOTAL LENGTH: 1.58 m

Page 2 of 2 X-RAY LOGGED BY: E. Kane 9/18/96

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
1.09	~15 W	Faint onshore-dipping beds.
1.19	15 W	Faint onshore-dipping beds. Dips decreasing.
1.22	3 W	Faint onshore-dipping beds.
1.39	10 W	30 mm thick coarsening downward section. Fine-coarse sand at top, med-coarse at bottom.
1.42	10 W	Fine-med sand.
1.43	10 W	Sharp contact w. offshore-dipping crossbeds.
1.44	15 E	Offshore-dipping beds (fine-med sand)
1.46	20 E	Fine-med sand w. common v. coarse sand to fine gravel sized grains.
1.57	~20 E	Med-coarse sand w. abundant med-coarse shell fragments.
1.58		End of core.

CORE # 41 TOTAL LENGTH: >1.23 m

Page 1 of 2 X-RAY LOGGED BY: E. Kane 9/18/96

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
0	?	Med-coarse sand. Bedding disturbed &/or indiscernible in top 0.3m
0.30	?	Fine to med sand w. 1-2 mm beds. Bedding highly disturbed.
0.41	?	Apparently massive fine-med sand.
0.53	?	Med sand w. common very coarse sand to fine gravel grains.
0.77	0	Sharp horizontal contact w. fine-med sand. Bedding below contact is horizontal, faint.
0.87	0	Sharp horizontal contact w.coarse sand to gravel. Occasional coarse gravel grains (up to 25mm) (very poorly sorted). No discernible bedding.
0.96	~0	Sharp horizontal contact w. fine-med sand.
	8 W	Very faint bedding, dipping onshore.
0.99	8 W	15mm thick bed of med-coarse sand w. abundant shell fragments.
1.00		Fine-med sand. Bedding very faint.
1.04	6 W	30mm section of alternating med-coarse and fine-med sand.
1.07		Faint thin beds of fine-med sand.
1.15	12 W	20mm coarsening downward bed of med sand to med-coarse sand.
1.17	12 W	Contact w. fine-med sand. Very faint bedding. Dips shallowly onshore. Dip decreases w. depth.

CORE # 41
Page 2 of 2

TOTAL LENGTH: >1.23 m
X-RAY LOGGED BY: E. Kane 9/18/96

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
1.22	0	(Horizontal bedding)
1.23		End of film.

CORE # 50
Page 1 of 1

TOTAL LENGTH: 1.20 m (?)
X-RAY LOGGED BY: E. Kane 9/18/96

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
0	E	Fine-med sand, bedding disturbed by coring.
0.14	E?	No discernible bedding.
0.20	15 E	Very faint beddng.
0.23		No discernible bedding. Fine-coarse sand.
0.58	E?	Distinct but disturbed beds, 1-2 mm thick. Fine-med sand w. abundant med shell fragments. Beds asymmetrically convex upward (longer limb to east)
0.66	20 E	Faint, slightly disturbed bedding. Dips decreasing.
0.68	~10 E	Faint bedding.
0.70		No discernible bedding. Fine-med sand.
0.85	25 E, 30 W	Slightly asymmetric convex upward bed. Longer limb is to west.
0.86		No discernible bedding.
1.00	5 E	Faint bedding, dipping shallowly offshore.
1.01		No discernible bedding.
1.10	0	Faint horizontal bedding. Dip increases slightly w. depth.
1.17	15 W	
1.20		End of film. End of core?

CORE # 62 TOTAL LENGTH: 3.20 m

page 1 of 2 X-RAY LOGGED BY: E. Kane 9/4/96

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
0	--	Disturbed by coring - no structures visible
0.11	10-30	1-5 mm - thick faint crossbeds, dipping
	W	onshore. Beds become more distinct with
		depth. Some shell fragments.
0.30	--	Disturbed/no structures
0.38	20-30	1 - 3 mm thick crossbeds, dipping on shore.
	W	Crossbeds @ 0.42-0.49 m appear disturbed.
0.57	20 W	Dips decreasing. Common shell fragments.
0.63	20 W	Common shell fragments, sand-sized.
0.71	--	Disturbed/no structures.
0.74	25 W	Crack, apparently along bedding plane
0.80	20 W	Crack, apparently along bedding plane
0.85	20W	Last faint indication of bedding before
		disturbed section below
1.0 - 1.25	--	Film missing
1.24	5-10 W	2-5 mm thick crossbeds. Occasional
		pebbles, 3-8 mm.
1.35	--	Apparently structureless/massive section.
		Common shell fragments.
1.45	0	Indications of bedding re-appear. Sed is
		sand-sized.
1.46	10 E	Coarse sand & pebble lag. Dip increases
		w. depth. Pebbles up to 16 mm.
1.49	25 E	

CORE # 62
Page 2 of 2

TOTAL LENGTH: 3.20 m
X-RAY LOGGED BY: E. Kane 9/4/96

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
1.55	~20 W	Return to finer-grained sed, alignment of
		flat shell fragments indicates on-shore-
		dipping beds.
1.62	--	No indications of structure/bedding
1.82	50-70	Bedding structures (disturbed by coring?)
	W	Abundant shell fragments (sand-sized)
1.89	30 W	Dips lower-presume undisturbed
1.94	--	No indications of bedding (structureless/
		massive) Abundant shell material
2.00	--	End of Log

CORE # 63 TOTAL LENGTH: 3.20 m

Page 1 of 3 X-RAY LOGGED BY: E. Kane 9/5/96

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
0	--	Structureless/massive sand-size sed.
		(fine-med)
0.18	10 W	Crack across core, possibly indicating
		bedding plane
0.19	--	Continued structureless/massive sand-size
		sed.
0.44	35 W	Faint indications of bedding (e.g. alignment
		of flat shell fragments)
0.50	20 W	Faint indications of bedding (e.g. alignment
		of flat shell fragments)
0.58	25 W	Bedding much clearer, 1-2mm thick crossbeds
0.68	35 W	Bedding much clearer, 1-2mm thick crossbeds
0.75	25 W	Bedding much clearer, 1-2mm thick crossbeds
0.80	10 W	Bedding bedoming more faint
0.85	5 W	Bedding becoming more faint
0.86	--	No indications of bedding
0.96	15 W	Faint bedding, aligned shell fragments
1.06	25 W	Last visible indication of bedding in this
		interval
1.07	--	Structureless/massive occasional pebbles
		(3-8 mm) and shell fragments (~5mm)
1.82	22 W	Increase in shell content (0-30+ % over 3cm)
		Bedding visible by alignment of shell
		fragments
1.88	45 W	Dip increases dramatically

CORE # 63 TOTAL LENGTH: 3.20 m

Page 2 of 3 X-RAY LOGGED BY: E. Kane 9/5/96

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
1.93	25 W	Dip decreases. Shell content decreases suddenly.
2.05	20 W	Faint indication of bedding
2.08	--	No indications of bedding. Sudden increase in shell content.
2.13	20 W	(Shell still abundant) indications of bedding
2.16	10 W	Decrease in shell content (still common)
2.20	30 W	Shell still common. Dip increasing
2.27	20 W	1 cm thick bed w. higher shell content
2.35	10 W	(Dip decrease over 2.20 - 2.35m)
2.38	--	Shell fragments suddenly more abundant. Bedding structures not apparent (Fragments oriented randomly)
2.46	?	No Data
2.50	0	Aligned shells faintly indicate bedding
2.66	15 W	Stronger indications of bedding - Shell content slightly higher
2.78	10 W	Dips decreasing. Beds fairly distinct
2.835	5 W	Dips decreasing. Beds fairly distinct
2.92	0	Dips decreasing. Beds less distinct
2.96	5 E	Beds begin dipping offshore slightly. Shell fragments common

CORE # 63 TOTAL LENGTH: 3.20m

Page 3 of 3 X-RAY LOGGED BY: E. Kane 9/5/96

BEGIN DEPTH (m below top)	DIP (deg)	DESCRIPTION
3.04	0	Dips decrease to zero.
3.10	0	Last faint indications of bedding
3.11	--	No indications of bedding. Shell content
		increases gradually toward bottom of core.

Appendix B - Radiograph Logs

Radiographs were obtained from thin, parallel-sided slabs approximately one cm thick using conventional techniques. Radiographs were obtained for the following cores:

Core#07
Core#09
Core#10
Core#11
Core#12
Core#22
Core#23
Core#24
Core#25
Core#26
Core#27
Core#32
Core#33
Core#34
Core#35
Core#36
Core#37
Core#38
Core#41
Core#50
Core#62
Core#63

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13.ABSTRACT ***(Maximum 200 words)***

This report describes research conducted as part of the Duck94 Nearshore Processes Field Experiment, a multidisciplinary study that took place during the summer and fall months of 1994 at the Field Research Facility (FRF) of the Coastal and Hydraulics Laboratory, U.S. Army Engineer Waterways Experiment Station. The FRF is located at Duck, NC. Work consisted of reconnaissance field studies which sought to develop tools for hydrodynamic and bathymetric interpretation of nearshore sedimentary structures, using as primary data sediment cores taken in close proximity to fluid-motion and bed-elevation measurements. The report contains core logs of sedimentological data, which record the time, location, and orientation of all samples, as well as a description of sedimentary structures obtained by visual inspection and by x-radiographs.

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